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NATIONAL COLLEGIATE TRACK COACHES ASSOCIATION ☆

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THE NATIONAL COLLEGIATE TRACK COACHES ASSOCIATION

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GREETINGS BY WILLIAM WARD

Coach of Track and Field, St. John's University, N. Y.

Members of the National Collegiate Track Coaches Association, friends and guests. On behalf of the Metropolitan Track Coaches let me bid you welcome to New York. May your stay be a fruitful one in the exchange of ideas here at the clinic and a pleasant one socially. If there is anything we of the Metropolitan group can do to further these ends we are at your service. At this time it gives me great pleasure to turn the meeting over to the president of the National Association, Clyde Littlefield of the University of Texas.

Safety In Track and Field

BY DR. DON CASH SEATON

Head Physical Education Department and Track Coach, University of Kentucky

(An address before the Track Coaches Association of America, Commodore Hotel, New York City, January 12, 1950)

Track and field is one of the least hazardous of the major competitive school sports. This is quite ironical when one remembers that practically all of the events originated and were practiced for combat in war. And despite the unbelievable changes in the types of warfare through the ages, track and field events still furnish the basic skills for the conditioning of modern warriors.

This very safeness of track contributes greatly to its popularity and we find over a million high school youngsters and at least 608,000 college students participating each year. It would, of course, be impossible for this many to participate in any activity without injury, so let us look into the types, numbers, and seriousness of track and field injuries.

It has been found that the accident incidence per one thousand exposures is only .7 for college men and .32 for high school youngsters. Of these, more than 80 percent of track and field injuries occur to the leg and foot, arm and hand. Head and neck injuries are more frequent in high school, and thigh injuries in college.[1]

As in other sports, it has been estimated that at least 50 percent of the accidents in track and field can be eliminated[2] so let us examine the injuries, their causes and methods of prevention.

What Are the Injuries in Track and Field?

The serious injuries in track and field may be classified into four major categories: 1. fractures and severe sprains; 2. pulled muscles; 3. contusions; 4. heart injuries.

The common minor injuries are: 1. strains; 2. wounds; 3. shin splints.

First, let us examine the causes and methods of preventing the more serious injuries.

Fractures and Severe Sprains are most common in the jumping events. In fact, Lloyd and Eastwood found that these events accounted for 67 percent of the injuries to high school participants. Improper take-offs and landing pits contribute to these injuries. A few safety hints for their construction would include:

1. The building of the polevault and high jump pits high enough and large enough. They should be of shavings and sawdust at least 18 feet by 16 feet for vaulting and at least 18 feet by 12 feet for high jumping. The vaulting pit can be at least four feet high and the high jump pit about three feet. The development and use of the new steel pole may solve the problem of the injury from the broken vaulting pole.
2. The broad jump pit should be at least 6 feet wide and 18 feet long filled with sand. The runway should be at least 6 feet wide so that the runners can take off at different spots on the board. There are a few coaching hints that may also prevent injuries in these events. Novice high jumpers, especially those in physical education classes should not be allowed to scissors jump and in the Western roll not allowed to light on the hands. In the pole vault and high jump men should be constantly warned to avoid stepping on the cross bar when landing. The metal cross bar is particularly dangerous in this respect because it does not break or give when the foot lands on it. By jumping after runs of short distances, increasing to longer runs, the broad jumper becomes more accustomed to the shock and force of the take-off.

An occasional fracture or severe sprain occurs in the hurdles or by stepping upon the curb of the track and the methods of avoidance will be discussed later.

Pulled Muscles are the bug-a-boo of all coaches. Each has his pet theory for avoidance and it is hoped that some will wish to add their suggestions during the discussion period. But, first, let us see what causes the pulled muscle, or tendon. The injury usually occurs to the antagonistic muscles which apparently have failed to relax. So far as the author can determine, we can only guess as to why the antagonistic muscle (usually the semitendinosus and semimembranosus of the thigh) fails to relax but we usually think it is caused by fatigue, being cold, or by an unusual strain such as caused by taking a curve, stepping in a hole or on the curb. One of the common causes, which probably should be classed under "fatigue" is the falling arch. This common occurance is often responsible for the placing of unusual strains upon different muscles and the fatigue causes the tendon or muscle to pull.

Occasions when the pulled muscle happens most often, in the opinion of the author are: 1. in starting, 2. beginning a drive for the finish in a race, and 3. when receiving the baton.

Listed below are a few suggestions for the prevention of pulled muscles:

1. The warm-up period should include a thorough set of exercises that stretch the "ham string" muscles of the legs. (This is probably the reason that hurdlers do not experience as many pulled muscles as would be expected in such a muscle-pulling event.)
2. Do not practice starting until after at least two weeks of the practice season. Monday is usually a bad time to practice starting as is every cold day.
3. In passing the baton be sure the feet are placed straight ahead upon starting. Standing sidewise places an unusual strain upon the legs.
4. Practice on curves at all speeds should be a part of planned workouts. This is especially valuable for indoor running where the different sized curves are prevalent.

There are other suggestions that you track coaches will want to make, but before we move on to the next injury, it should be mentioned that a track man who feels the beginning of a pull should stop and then be rested for a considerable length of time. Another aspect of the pulled muscle should not be overlooked—that is, that a pulled muscle probably never heals to its former strength. It is believed that the other muscles must take over the function of the injured one. This means that the injured athlete must be given a long time to rest and come back

[1] Lloyd, Deaver and Eastwood, *Safety in Athletics*, Philadelphia; W. B. Saunders Co., 1936. p. 106.

[2] Seaton, Don Cash, *Safety in Sports*, New York, Prentice-Hall, Inc., 1948.

and that the man with the severely injured muscle may never again be able to run or jump at maximum ability.

Contusions. The third type of serious injury was spoken of as a contusion because of the lack of a better descriptive phrase. By this is meant those injuries that result from being hit by a flying implement, the shot, discus, javelin, or hammer. The danger from these flying missiles has sounded the death knell of two very spectacular events. We have seen the complete abandonment of the hammer throw in high school competition while only the East continues to use it in College. The javelin is experiencing about the same demise.

There are many precautions that should be taken to make these field events safer so that only a few can be mentioned:

1. The implements should only be used under supervision.
2. The hammer and discus should be thrown from behind a practice screen and the landing area of all events should be fenced off, especially during meets. A temporary fence of rope or wire is sufficient to remind the unwarry of the danger.
3. The implements should be returned by being carried back.
4. The hammer must be constantly watched for defective parts and a split javelin never thrown.

Heart Injuries are the most tragic of all track injuries. No one knows the extent of this crippler and killer but the layman thinks that every track man suffers from this injury or disease. It is commonly believed amongst medical authorities however that a normal heart suffers no ill effects from distance running. The early adolescent heart may suffer however, and there is considerable danger for any heart when chronic infections are present. The greatest danger probably lies in the return to practice or competition too soon after an illness. The young man who has been out with some illness such as the flu for a few days is the case for the Coach to watch most closely. In the eagerness to win, we are liable to press the athlete back into service too soon and thereby injure his heart for life. To be on the safe side, we must insist upon a qualified physician's permission and prescription of exercise for the athlete who returns from an illness—especially those that tend to weaken the heart.

The Minor Injuries. Strains of the muscles and joints occur from many sources, some of which have been discussed above, but probably the most common are those resulting from the throwing events. In the shot put the novice must be cautioned against "throwing" the shot which can usually be avoided by placing it in front of the shoulder and keeping it there at the start of the delivery. The back strain is a common complaint amongst discus throwers. To avoid it, the thrower must use plenty of twists and stretching exercises in his warm-up period and then be careful not to leave his weight on his right foot too long at the start of the throw. The discus thrower should never wear football or baseball shoes or track shoes with spikes that are too long because of the danger of knee injuries from twisting.

Another injury which all track coaches would like to learn how to avoid is the arm injury of the javelin thrower. These injuries range from the common strain to the "glass arm." The author knows of no sure means of preventing these common injuries other than the usual precautions of: 1: Don't throw too hard too often; 2. Warm up thoroughly; and, 3. Try to build up the throwing muscle during all the year with similar exercises.

Wounds, especially minor ones, occur in practically every event from various and often odd sources but the most common and usually the most serious are spiking and the abrasions caused by falling to the track. The injuries occur most often during crowding at the start of races, at the finish line, and in hurdling. About the only way to insure against falling and spiking at the beginning of distance races is to limit the number of starters or run in lanes. But all runners should be taught that to dive or fall through the finish tape is not only dangerous but often leads to their being defeated by the runner who drives on through.

Hurdling presents many more hazards to the trackman than running on the flat and there are several safety hints that should be listed to help prevent injury:

1. The hurdler should never be allowed to take a hurdle slowly.
2. If the lead leg is kept straight (as possible) it reduces danger greatly.
3. The high hurdles should be practiced before the lows if the same man does both. (The author is unable to give a logical reason for this, but it seems to work out.)
4. Both hands should be kept forward during the learning period and in the early practice period.
5. Beginners may be taught with the hurdles on grass and the hurdle crossbar padded.
6. The hurdle weight should be set "light" for much of the practice and the gate never allowed to swing in the lows.

Shin-splints are minor injuries that cause a lot of trouble. They may, of course, become so severe that the trackman cannot compete but usually they are merely discomforting. It is the considered opinion of the author that shin-splints are usually the result of the arches dropping. We usually ascribe the cause to working on hard tracks which is often, of course, only the cause of the weakening of the arches. If this is true, then a thorough system of foot exercises should be taken by all runners. This precaution, plus taping of the arches, has been quite effective during the last two seasons at the University of Kentucky where it is necessary to work out indoors on hardwood floors.

In conclusion, it would seem that although track and field is one of the safest of sports there are nevertheless many accidents and injuries that could be avoided. To do this, every coach is urged to:

1. Keep an accurate check of when, where and why accidents are happening. Then use these data to improve the safeness of his practice sessions and competitions by intelligent coaching.
2. Provide his men with adequate and safe equipment and to make sure that the facilities are constructed and maintained with safety in mind.
3. Remember that the greatest harm that he can inflict is injury to the heart of an athlete. To avoid this he must not use a man who has a chronic infection or press one into service too soon after a heart-weakening illness.
4. Bend every effort to make the hammer, discus, and javelin throws safe events because they are the only ones that can kill.

If all these general precautions are observed, track and field will continue to be a safe sport and to increase in popularity—especially with the parents.

Straddle Form of High Jumping

BY DON CANHAM
Track Coach, University of Michigan

For several years, at the University of Michigan, we have been quite interested in the possibilities of the straddle style of high jumping. While we have not had any world record holders in this event, we have the feeling that the seven foot-plus high jumper will probably be a straddle jumper.

To put it briefly we feel that with proper straddle form, a man can clear a greater height with this style than with any other. By way of a small illustration, we have had three men in our track history clear 6'7" or better. One man did it with the Eastern roll, one man with the Western roll, and one man with the Straddle Style. We are convinced that the man who cleared 6'7" with the straddle had less natural ability than the other two. We thus feel that it was the mechanics of the form that enabled him to clear that height.

In our opinion the Eastern style is the least efficient. Our moving pictures of Albritton, Walker, Steers, Stewart, Weisner, Phillips, and Mondschein convince us at least, that it requires a higher center of gravity to clear say 6'6" with the Western roll than it does with the straddle style.

It appears, however, that it is a great advantage for a straddle jumper to first learn the western roll. This seems necessary to assist the jumper in learning to take off directly over his take-off foot. This is particularly true of high school high-jumpers. Without any doubt the average high school jumper would jump higher with the western roll and he would also provide himself with sound fundamentals so necessary to good straddle jumping form.

Boys learning the straddle style, (and even experienced performers) tend to lean into the bar at the take-off. This, of course, does not permit the maximum lift at the take-off because the weight is not over the take-off foot. The tendency to lean in at the bar is minimized to a degree with the Western roll and, of course, that is why we find better take-offs with this style, and why we like to have a boy learn the Western roll before he straddles.

For the sake of simplicity we will list what we feel are the most important fundamentals in each stage of the straddle style of jumping. Naturally these principles are not hard and fast rules as all boys do not fit the same mold. Naturally we do not feel that these are the only methods of teaching this style, but they have helped us and perhaps they will help some coach or athlete with their particular problems.

The Run in the Straddle Style

1. We use a maximum of six steps to the bar and a maximum of eight.
2. Our emphasis is on even strides. Eliminate a hop or skip as it is almost impossible to be consistent at the take-off without even strides in the run.
3. Use only one check mark and that should be at the start of the run, or at least six strides from the bar. A man thinking about hitting a check mark two or three strides from the bar usually does not have time to concentrate on the leap.
4. Acceleration in the run is important. We believe in accelerating about four strides from the bar.
5. All stages of the run must be relaxed effort.

The Take-Off

1. The foot plant is not in line with the run as in the Western roll. It is almost at a right angle to the bar. This is necessary to compensate for the tendency to turn into the bar which is present in all straddle jumpers. The forward motion does not go over the side of the foot so much with this type of foot plant.
2. We like sprint shoes for jumping, as it gives an incline plane effect. It lets the jumper's heel drop lower than in a conventional jumping shoe with a heel.
3. We disregard arm action, but emphasize a hunching of the inside shoulder, to try and prevent the man from dropping off to the side of his foot.
4. We prefer a semi-straight first leg kick for we feel a pendulum action of the lead leg (like Steers) has an advantage. Bent lead legs (Albritton, Cruter) of course, fit a particular style and we only wish we had a few men of this type. We no doubt would change our feeling on the lead leg.
5. The kick should probably be along the bar rather than at the center. A kick at the far standard for instance tends to draw a man (who falls-off at the take-off) up over his take-off foot where he should be.
6. It is impossible to tell a boy where to look at the take-off. He must keep his head up, however. He should never look at the spot of take-off. Boys who have no confidence in their run and steps usually are the ones who look down at the take-off.

Form Over the Bar

1. The second (or trailing) leg is usually the most difficult member to handle in cross-bar clearance. We use a ground exercise to assist in back leg clearance. We drive the second leg straight back and turn the toe outward which is what we want to take place over the bar.
2. The head plays an important part in second leg clearance. Turning the head back to the direction from which the man ran at the same time the second leg action starts helps trunk rotation and facilitates hip snap or roll. This, of course, assists in second leg clearance.
3. The inside arm often causes trouble also, Albritton carried his behind his back, some extend it over the head. We like to keep it at the side. In any case, it should never be between the body and the bar.
4. There are few problems with the outside arm, but we do feel it must not come across the body at the take-off, as it tends to turn a boy into the bar. It should, however, start down toward the pit immediately after the jumper has attained his maximum height.

There are naturally many, many details that we have not been able to cover here. On the other hand, boys can not go far wrong if they develop a relaxed even run with some increase in speed during the last four strides; a take-off that keeps the weight over the foot; a lead leg that has some pendulum action to assist in the lift; and the incorporation of head and second foot rotation to assist in second leg clearance.

Observations on Distance Running

BY FRED WILT

Former Indiana Distance Man, Now With Federal Bureau of Investigation

It is an honor to appear before such a distinguished group of coaches and I should like to qualify anything that I may say by stating that I am no expert but merely an interested participant in track activities. The topic of my conversation this afternoon will be observations which I have noted concerning training techniques used by European athletes and a comparison of these techniques with those in general use by American athletes.

It appears to me that nothing new has been discovered in the line of training, and I feel that anything I may have to say will merely be a reiteration of what is common knowledege among our better informed and more progressive coaches in track and field athletics.

In a comparison of form between European and American middle distance and distance runners, I have noted that the Americans have a distinct tendency to overstride. It appears to me that the Swedes and Finns consider it much faster to take two short steps than one long step in racing all of the distances from the half mile to 10,000 meters. The Swedes have long discarded the old idea that it is wasteful to kick up the heel behind in running. They believe that this is a perfectly natural movement and that it brings the leg through more quickly for its next stride. They also think that in distance running the knee should be lifted in front only sufficiently to clear the corresponding foot in its forward swing.

I can recall during my years of track competition at Indiana University, where Coach Hayes would insist that I lift my knees high during any type of running. I now believe that is wrong, and that an excessively high knee lift wastes energy in any type of running, except sprinting. The Swedes advanced the theory that there must be no pause in the foot swing in the course of taking a stride, and there must be no conscious reaching out of the fore leg for distance. If this happens the knee locks and there is a "bounce" or slight block at each stride. The foot should swing back immediately after the leg has gone forward in the stride, so that at the time the foot strikes the ground it is actually pulling the body forward. During the days of Paavo Nurmi it was considered wise to use excessive hip and shoulder swing in an effort to gain a longer stride, but it is now generally conceded among European athletes that this produces overstriding and a consequent loss of strength and speed.

In summing up the stride in general, I would say that overstriding is one of the serious faults a runner can make. Generally speaking, the slower the speed of the race the shorter the stride should be, and the faster the race, the longer the stride. Thus, in the sprinting the stride should be longest, and in long distance running or any type of running at a slow speed, the stride should be extremely short.

The placement of the foot as it hits the track in running is a subject of considerable controversy among American athletes and coaches but I have found that the European coaches and athletes are in general agreement about this particular phase of form. I am convinced in my own mind that the correct way for the feet to react in running is for the ball of the lead foot to touch the ground first, then the heel comes down and touches the ground, the body rides forward over the heel as it touches the ground. As the next step is being taken the weight of the body goes forward, the heel comes up and the runner pushes off on the toe of the trailing foot. Often we have heard high school coaches make a statement that the Finns use some sort of a roll in their stride, allowing the heel to touch the ground first. This is entirely incorrect and to emphasize that point I might mention an incident that occurred last February when the Finnish Olympic Coach, Armas Valste, visited the United States. I asked Valste about this heel and toe type of running which the Finns were supposed to do and he laughed. Valste said, "I can't understand why you foreigners think we in Finland advocate such a type of running."

He said that it is possible to run by allowing the heel to touch the ground first, but it is very slow and it jars the body badly. By these remarks I do not mean to indicate that a middle distance or distance runner should run flat footed. That would be just as serious a fault as allowing the heel to touch the ground first or running exclusively on the toes. I want to point out again that I think the correct way to allow the foot to strike the track is for the ball of the foot to touch the ground first, then the heel comes down. I have noticed that the European athletes conform to the same principle. While I was in Stockholm during the summer of 1949, Mr. Gossa Holmer, the Swedish Olympic Coach, was watching me take a workout and noticed that I was running too high on my toes. He questioned me as to whether I was having any trouble with soreness in the calves of my legs, and I replied that I was. He stated that I could avoid this if I would lift my toe up just before my foot strikes the ground. This does not mean that I should land flat footed, but it merely means that I avoid pointing my toe down in the normal course of striding and thus relieve my calf muscles of a lot of shock, which is normally incurred if a runner runs too high on his toes.

There is a theory among many high school coaches and a few of our college coaches that a runner can not sprint if he allows his heel to touch the ground. Such coaches as Chic Werner of Penn State, the late Billy Hayes of Indiana and Carl Merner of Columbia, have long advocated that in the best sprinting style, the heel must touch the track with each stride. I don't know exactly why so many coaches refuse to allow the heel to touch the ground in sprinting or any other type of running. Perhaps it is because in the 1880's coaches thought it looked faster or perhaps it's because present day artists usually draw pictures of a marathon runner running high on this toes. A simple analysis of the matter will show that without allowing the heel to touch the track in any type of running, the athlete loses a considerable amount of leverage. Let us take an example. Let us call the toe A, the heel B, and the knee C. With the foot resting on the ground we have the angle A, B, C. In a standing position the angle A, B, C is approximately 90 degrees. As the foot is lifted and placed in a stride position with the toe pointed down touching the track, the angle A, B, C approaches 180 degrees. If you will allow the heel to touch the ground, this decreases the angle A, B, C. As the body passes forward over the foot with the heel touching the ground, angle A, B, C decreases to approximately 75 degrees. Now with the foot back of the body ready to push off, angle A, B, C is depressed to a maximum amount if the heel is touching the ground. This gives a maximum amount of leverage in propelling the body forward as the runner pushes off for the next step. However, if B is not allowed to touch the ground, then angle A, B, C can not be depressed to a

maximum amount, and a considerable amount of leverage is lost. Not only does allowing the heel to touch the ground in all types of running produce better leverage in the push off, but it allows for more comfort to the leg muscles. As a practical demonstration of what I have just said, if running without allowing the heel to touch the track is correct, then why don't we put spikes on women's high heeled shoes and have our sprinters use those? Absurd, Of course! But so is running without touching the heel to the track. There is no logical reason why the heel should not touch the track in any type of running or sprinting; and every logical reason why the heel should touch.

One of the problems which bother certain runners is the carriage of their arms during various phases of running. I have noticed that the European athletes differ widely in their arm carriage and they appear to allow nature to take its course in that particular phase of running. Generally speaking, any arm carriage which does not cause fatigue is correst. As a matter of fact I have noticed that there is actually a slight amount of cross arm action among some of the great runners such as Rieff of Belgium and Haag and Strand of Sweden.

In racing techniques I have noticed that the European athletes have departed from the usual American technique of running the first and last quarters of the race fast and allowing the pace to decrease considerably during the middle part of the race. As an example, an American athlete might try to run a 4:20 mile by making the quarter mile times in 62, 68, 68 and 62. And a European athlete would probably try to run a 4:20 mile in 66, 66, 65, 63. The Europeans go by the theory that by running the first half of a race at a steady even pace, they can run the last half of the race in a mile two to four seconds faster than the first half. This appears logical to me, inasmuch as it allows the body to operate under a much less oxygen debt than if the first half of the race is excessively fast.

Now I would like to give some specific examples of how the Swedish and Finnish athletes do their training in the woods. Individual difference among the European athletes is the paramount consideration as it is among our own athletes. The European athletes prefer to train in the woods and on grass where the surface is soft, and I think we might take a hint from them and have our own athletes do more of their training on golf courses and over soft paths in the woods. In the winter time the athletes in the northern European countries prepare themselves for the spring track season by walking and running from one to two hours each day in the snow. Their young athletes take a certain amount of pace work each day on the track, but do the major part of their training in the woods. Where an American athlete will train for a certain distance, the European athlete will train for a certain length of time. An American athlete might say he is going to run three or four miles or six 220's, but a European athlete will say he is going to train for one or two hours at running, sprinting, and walking in the woods. Here are some of the work-outs these athletes take. I learned about these work outs through correspondence with various European coaches, by conversation with the foreign athletes, and by actually training with these athletes in Norway and Sweden and other countries.

1. Easy running as a warm up for about 10 minutes.
2. Continuous running for 15 minutes at a speed of 5½ to 7 minutes per mile, taking 3 to 6 wind sprints of 60 to 75 yards each en route.
3. Easy walking and jogging for 5 to 10 minutes.
4. Sprint up hill about 100 to 200 yards.
5. Easy walking and jogging for 10 minutes.
6. About 440 yards at three-fourths maximum speed and walking 5 minutes afterwards. Repeat this 440 yard run 1 to 2 times if desired.
7. Walk and jog 10 minutes.
8. Three to six wind sprints of 75 to 100 yards each.

Another work out might be as follows:

1. Easy running for 10 minutes as a warm up.
2. Fast steady running for ¾ to 1½ miles.
3. Easy walking and jogging for 10 minutes.
4. Three to four times 220 yards wind sprint.
5. Easy running for 1 to 2 miles taking very short steps.

I sometimes think that if our American coaches would have their track athletes do in the woods exactly what they have done on the track, they would be training exactly as the European athletes do. It appears to me that the method of the woods training that the European athletes use avoids a certain psychological barrier present in the minds of many boys, which is namely, the monotony of going around the track too many times in practice. I think the best example of how an athlete actually trains in the woods can be brought to your attention by reading to you a letter which I have received from Gossa Bergkvist of Gavle, Sweden. Bergkvist is 29 years of age, a fireman by occupation, and one of the world's best milers. This past season his best time was 4:05 for the mile.

"Dear Fred:

"I promised to tell you about how I and the other boys in Gavle train and I hope you will gain something worthwhile from it. Individual difference is everything. I am sure that many people say that we train too much in the woods, but I will never train otherwise. This season I have trained on the track only three times, but everyday I train in the forest. My best times are 3:47.4 for 1500 meters, and 4:05.4 in the mile. My teammates in Gefleif train exactly as I do. Henry Ericksson has done 3:44 for 1500 meters and Olle Aberg and Ingvar Bengtsson have done 3:48.4 and 3:48.6 respectively for 1500 meters. We all prefer the woods and the grass for our training. Before talking about training I will tell you when, where and how.

"Our season is finished in October. In April the cross country races are beginning and in June we start the track races. We have no in-door tracks and our training is adjusted to give us the best results the last week in July through August and September. When the season is finished in October, we take it easy to December. To take it easy I mean I practice four or five times a week in the woods. That is just easy running mixed with long walks. Each training session takes me 1 to 1½ hours. Sometimes I walk 2 to 4 hours in the woods. I think it is better to take the training over a long period such as 1 or 2 hours, than running very hard for a short period of time. This training is to relax the muscles of the body and give me a chance to repair my mind and fighterwill. In December I train in the snow which is my biggest help. I run and walk in the snow as much as possible and of course go skiing and skating. For running it is best to have the snow about 1½ feet deep—if it is deeper I only walk. The first mile we take at easy running when there is no snow. After this warm up I run a mile at moderate speed in the snow, not thinking of speed, but only of building up my endurance. Then I walk half a mile and then run half a mile. Then I stop and return home doing the same mixture of running and walking. Another day I go by skiis for 10 to 15 miles. I sometimes walk in the snow for 2½ hours and alternate between snow covered and snowless paths. The steps are sometimes short and fast and other times very long.

"In January and February I use the same schedule as in December but every day is a little harder. I never follow the exact same schedule each day, but I allow the way I feel to be my guide. It is no use to go and train and run hard if you do not feel like it. Forcing yourself is a dangerous technique; but don't misunderstand me and think I am staying home and not training for the smallest reason. In March, I am doing the same but the snow is

slowly melting, and in April we begin to run more and faster. First a warm up for 10 minutes and then directly to 2 miles at one-half speed; then easy running for 10 minutes, and then 2 miles at one-half speed. Take a little rest by walking before running a half mile at three-fourths speed (almost full speed); then easy running again and another half-mile at three-fourths full speed. Then reduce your fatigue with easy running and go on until you are rested again. Another day, instead of 2 miles at ½ speed, I run 3 to 4 miles like this: almost full speed for 300 yards, then easy running to regain my breath again, then 300 yards at almost full speed, easy again, and so on, finishing with two miles at one-half speed and feeling well. This month, April, I train in the woods and in spikes. In May I do the same as in April but twice a week I finish my training after running in the woods by running about 20 minutes on the track. On the track I run a lap fast, a lap slow and so on, and finish with 4 to 8 sprints of about 100 yards each. This is enough training on the track for a 1500 meter runner. Condition is the important thing.

"A newcomer or beginner must train more on the track, but when he has done a season of racing there is no need for him to train on the track. At the end of April and May we have the cross-country season. I run four to five races of not longer than 4000 meters each. In 1947 and 1948 I was champion of Sweden in cross-country. In June the track season begins with races every Sunday. I train as usual, except the day before a meet. In July, I take the training more easily because the races are so hard, and I'm racing at least twice a week. August and September are the same, with hard races, easy training, and so we are in October, and I have told you a year-around. Notice that I train on the track only in May and the first weeks of June.

"Your friend,
Gosta Bergkvist"

Marcel Hansenne of France was 33 years old when he retired from racing last season, his best year. He trains the year round, resting only a day before a race. He races from 40 to 60 times a season. He trains from 45 to 60 minutes each morning at about 11:00 a.m. in a woods or park located in Paris. He just starts out running in his sweat clothes, and continues at a moderate speed until he feels a little fatigued. Then he walks until he feels rested, and starts running again. He has no set plan of work. Usually during the course of his training each day he will take 2 to 4 sprints of about 220 yards. He also takes one to 3 runs of about 440 yards each at a speed of about 58 to 60 seconds. During the course of his easy running, he takes little rushes of 10 to 75 yards, doing this as much as 10 times if he feels good. His training, according to his description, is a period of joy to which he looks forward each day. He never steps on the track except in a race.

Emil Zatopec of Czechoslovakia is the hardest trainer I ever saw. He will train 3 times a day if time permits, and runs in rain, snow, sleet, or hot weather. He prefers running in the woods, but will train on a track, in a field, or in the roads or streets, wherever he happens to be. He is now 27 years old, and a captain in the army of his country. He has very little speed, although he has often run 1500 meters in the equivalent of a 4:10 mile. His training consists only of the old fashioned ins and outs which we in the U.S.A. are familiar with. As a boy he trained by sprinting 100 yards, jogging 100 yards, sprinting, jogging, etc., until he was exhausted. Gradually he increased the length and number of the sprints. Now he starts a workout by running 5 220's, jogging 220 yards after each. Then he runs 440 yards 20 times, jogging 220 yards after each. Then he will finish the workout with 5 more 220 yard windsprints. He takes no calisthenics, and doesn't even take a warmup for training. He just tears into a workout, and runs. The 440 yard runs mentioned above are in about 60 seconds each, according to what he says, but he admits that when he gets to the twentieth 440 yard run, it is sometimes a bit slower than the 60 seconds he is trying to make. Zatopec often takes this workout 3 times in one day. The Swedes say he is training too hard, and cannot last much longer.

I might say in closing that I have found it to great advantage to take a little running each morning, such as an easy warmup of one or two miles, and then take my regular workout in the afternoon. I did this in college, and it made me much stronger than I would have been otherwise.

The main difference between the way the Finns and Swedes train is that the Finns train much harder than the Swedes. I have found that most of the European top flight performers train two times a day. That is the case in the U.S.A., too, I believe, and might point to Curtis Stone as an example.

We should not be misled by thinking that these European boys have more ability than we Americans. We have far more distance running talent here in the U.S.A. than they do in Europe. I account for the difference in times to the weather. It is too hot to race in America in the summer, and furthermore American boys usually don't stay with running until they approach 30 years of age, as do the Europeans. But our distance men have speed, an all important essential which the Europeans in general don't have. When I look at a boy like Don Gehrmann of Wisconsin and compare his great ability with the Europeans I wonder why the Europeans ever beat us at any distance race.

It has been a pleasure to address this gathering, and I hope my conversation hasn't been confusing. I am still not an expert, but merely an interested participant in track.

Distance Running

BY TOM DECKARD
Track Coach, Drake University, Des Moines, Iowa

When thinking about distance running, I like to think of the procedure in developing boys to sustain effort. The first requisite in the training of distance runners is to find boys who are willing to pay the price for sustaining effort. And believe me there is a terrific amount of work involved to pay this price. When you have found these boys, your program of work will break down into three phases: over-distance, pace, and speed work.

We will pre-suppose an adequate warm-up for a day's work. A warm-up period of jogging, walking, striding, walking, fast striding, and a great deal of stretching exercises is a satisfactory warm-up procedure. I believe in an early instruction of the warm-up period in that it is an important part in the development of a runner. It is during this warm-up period that a boy can give his undivided attention to improving his form, improving his speed, and becoming aware of his errors. Eventually, the runner will gain from the warm-up a physical and mental outlook that will make the day's assignment easier.

OVERDISTANCE. In preparing for the track season, it is common knowledge that the cross country background is of all-importance in laying the foundation of overdistance for your distance runners. Our procedure of starting cross country runners is very similar to the program of cross country running that "Billy" Hayes had at Indiana. It consists of a tremendous amount of walking and running in the early part of the season. The rest of the season is devoted to a lot of overdistance, repeated work on pace over the mile and two mile courses to a great extent. Some work we do on the track so that we can be accurate on time checks for the various distances.

We have an unusual set-up at Drake in that our cross country course is on a golf course two miles from the stadium. This fall, we had seven freshman prospects, and they would run and walk to the golf course and then receive their work assignment when they arrived. The two miles out and two miles back plus the work on the course gave the candidates a great amount of running, without them being really aware of the miles they were building up as a backlog.

The first four weeks, the candidates were instructed to run for a distance at a speed they could carry easily and then were instructed to walk. The distance might vary from 880 to three quarters of a mile before they would walk. This procedure was repeated and repeated; and at the end of four weeks, the young freshmen were in fine physical condition. We placed emphasis on the group staying together on their repeated running as much as they possibly could. At the end of the season, the first five runners were very close on three and four-mile time-trial assignments. In fact, there was never more than thirty seconds between the first and fifth men. On a two-mile time-trial, the first and fifth men were separated by fifteen seconds. I give this example in that I believe the fourth and fifth men were encouraged to keep up with the leaders by repeated walking and running at a pace they could handle. It was also interesting to know that their performances and improvement at the end of cross country were much better than I could expect in view of their high school performances.

An important thing to remember in your overdistance assignments is that the assignment should not be so severe that the runner is forced into a dogtrot or a dogging pace before he covers the complete distance. Here again I believe the repeated assignment of a shorter distance will prepare the boy to sustain effort and keep him away from the habit of getting into a dogtrot or so-called "rut," and the mental "rut" that is so common in distance runners.

When one of your candidates has reached the stage where he shows great possibility on sustaining pace, he will be aware of it in that the feeling within the runner is that he has complete confidence in his ability to maintain the speed throughout the distance of the run. And he may even feel greater enjoyment in running at a good pace. On the other hand, if he is not ready to carry a fast pace for a run, you will be aware of it in that his speed will fall off somewhere around the middle of the distance, and he will show marked decrease in speed for the remainder of the distance. An example of what I am trying to say is the way the mature Swedish and Finnish distance runners go out and maintain a fast pace for two, four, or six miles. Seemingly, at no time is there any sign of distress or fatigue. The same, of course, holds true for some of our better American distance runners.

The overdistance work assignments are of utmost importance because I feel that without a good background of running, you will be unable to train the runner adequately on pace.

PACE WORK. Pace assignments will vary within your candidates, and the runners with natural speed will be able to handle pace work with more ease than your slow plodder-type candidates. I like to think of pace work as assignments under the actual race distance at a speed we hope to have the runner maintain in a race. For the one-milers, it will be in the form of ¾'s of a mile, 880's, and 440's. For the two-milers, it will be 1½ miles, 1 mile, and 880's. My work-out procedure on pace work is repeated assignments at the shorter distances with enough rest in between to give the boy time to recover only partially. I feel this program helps a boy in learning to hold pace when he is witnessing partial fatigue, and at the same time it is building up his ability to go into oxygen debt. I also feel that repeated pace assignments will improve the boy's running form, his speed, and in some measure improve his endurance.

SPEED WORK. Speed work is an important part of your week's work program in that we should improve the boy's speed as much as possible. I feel that the greater the margin of speed we can develop in a boy, the easier it is for him to achieve top performance in his event. It is logical to assume that a boy who can run 50 seconds on the quarter and has ability to sustain effort should reach the 4:10 mile with greater ease than a boy who can run only :56 on the quarter.

It is well established that milers and two-milers do well on speed assignments if they are assigned work with the half-milers. It is true in almost all cases that the longer distance runners will meet this assignment with a challenge and turn in pretty good speed performances. By the same token, the middle distance men will do better by giving them part of the distance runners' work as an over-distance assignment. A work program that has enough variety in overdistance, pace, and speed will be of advantage to the boy and the coach in that it is often possible for

a boy to do well over any distance from the 440 up through the two mile and including cross country—Wisconsin's great Gehrmann is an excellent example of this. Of course, there have been many others, and I feel that they had a varied program at various stages to enable them to do this.

There is great value in giving speed work assignments to your distance runners at the end of each day's work. This can be in the form of 110's or 220's. A freshening-up process seems to go on in the runner after he has had these speed assignments at the end of his day's work. I am confident that it makes the boy feel better, and at the same time he is getting speed training that can be used in his kick at the end of the race.

You will notice that I have made no attempt to set up a weekly work schedule. I feel that it is wrong to give a set schedule of work for all boys. The tremendous difference in boys' physical and mental abilities must be considered in setting up work programs for them. The amount of work given each day will vary in your individual candidates, and it would be wrong to work them to the same degree.

I feel that it is of utmost importance to know a boy's complete background and also his physical limitations in planning his development as a college runner. Also, it is well to keep in mind the periods of development so that a boy is improving at the proper rate at the proper time.

In conclusion, I would like to state that it is the coach's responsibility to have a mutual feeling with the candidate regarding his goals and ambitions in his event.

The Running Broadjump

BY IRVING MONDSCHEIN

For the purposes of clarification and instruction, I have divided the broadjump into four phases:

1. The approach
2. The take-off
3. The flight in air, and
4. The landing

However, before I start to elaborate on any of these phases, I would like to make a few general remarks on the broadjump.

While it is true that the best jumpers have been of the sprinter type, I believe that the individual concerned with making himself into a broadjumper must think of the broadjump as primarily a high jump at the end of a sprint. My theory is that once the individual has obtained the maximum speed on the runway, it helps little, as for as the eventual distance of the jump is concerned, to make a conscious effort to jump forward. The two most important factors in determining the distance of the jump will be:

1. How fast is the jumper moving at the time he hits the take-off board?
2. How high can he get off the board?

I am of the opinion that once the individual's speed is attained, his major concern should be the various other phases of the jump, such as the flight in air, and the landing. Keeping that in mind, let us now move on to the four important aspects of broadjumping.

The Approach:

There is no set distance that all jumpers can use in determining the length of the approach on the runway. Different types of jumpers will require approaches of different lengths. There are several factors to consider when determining the length of the approach.

A—The jumper's ability to accelerate quickly. That is, does he reach his maximum speed at fifty, seventy-five or one hundred sixty feet?

B—The jumper's ability to accelerate for a protracted period. That is, some jumpers can continue acceleration for a space of perhaps fifty feet and will need more room. Other jumpers will, perhaps, achieve their maximum speed more quickly, yet will take up little runway space doing so.

C—The jumper's psychological reaction to a certain length runway. The jumper might not be running any faster at 100 feet than he is at 75, but if he doesn't feel ready to jump at the 75 foot mark, the coach will be wise to move the mark back to 100 feet. The reverse of this is a jumper who feels that he has the urge to jump at 50 to 75 feet, although he may be able to generate more speed at 100 feet. His unreadiness to jump at 100 feet will do more damage to the jump than the benefit he would get from that extra speed he could generate in the last 25 feet.

(1) Check marks:

There is only one principle that I follow in the use of check marks, and that is, in marking off the length of the approach, the last check mark, which may be the second or third in a series of marks, should not be any farther than fifty feet to fifty-five feet from the take-off board. I believe this because I am of the opinion that no matter how uniform the jumper's stride may be, his take-off will vary anywhere from an inch to a foot in a run that is over fifty feet. This is especially true of high school athletes who may even be off their marks as much as three feet in an approach of only fifty or sixty feet.

By the time an athlete is experienced enough to have acquired a fairly constant approach, which may be when he is in college, or even out of school, it is not wise to move his mark back.

At N.Y.U. we always used two marks. One check mark at approximately eighty feet, which we would come up to at about ¾ speed. We would start from twenty to thirty feet in back of that. The second check mark would be placed at about fifty feet, and when we hit this second one, we would be moving at top speed.

We hit all the marks with the jumping foot. There is no reason for this except that we are striving for uniformity in procedure.

I like to think of the approach as a sprint at top speed all the way. Many coaches think that the last few steps should be slower or cut down, but I believe that the coach should not compel the boy to cut down. The athlete will do this naturally when he gets himself ready for the spring off the board. I like to teach my jumpers to run at top speed and when they are within two or three feet of the board to concentrate then on jumping, but make no effort to slow down.

The Take-Off:

The runner should attempt on his leap to get as high off the board as possible. There is little if any advantage gained in trying to jump forward. If the jumper is moving at top speed, all he needs to do is concentrate on height, and the distance of the jump will take care of itself.

There is considerable debate as to whether or not the take-off should be a stamp take-off, i.e. vigorous pound on the board, or "run off the board." While many jumpers and coaches maintain that a stamp take-off is not neces-

sary, this writer has never seen a good jump in which there wasn't a very vigorous pound off the board.

There should also be a very vigorous pull with the arms straight overhead at the moment of take-off. This is very useful in both attaining height and maintaining balance.

Flight in the Air:

This is another phase of the broadjump over which there has been much controversy. Some coaches maintain that the "walk in air" and the "hitch-kick" actually increase the distance of the jump. I disagree with this. I cannot see how any motion in the air can propel the body forward when there is nothing to push against. However, I do believe that the "hitchkick" and the "walk in air" may be a help to the athlete in maintaining balance in preparation for landing. I, myself, used a modified "hitch-kick" and then went into a "sheep vault" with my legs hanging back and my arms behind me, somewhat like the form used by Eulace Peacock when he was jumping.

This sheep vault I found particularly useful because I am rather heavy legged and I didn't have to hold the "L" position. I would just let my legs hang back until a split second before I hit the pit, and then swing them forward, reaching out as far as possible without losing my balance.

Landing:

Of course, the most obvious thing about the landing is that the jumper should try to make the mark in the pit as far from the take-off board as possible. This is done by extending the legs out as far as possible without getting off balance and falling backwards. There are 2 devices most commonly used to prevent the jumper from falling backward into the pit after he has made his reach with his legs.

1. This method is known as the "collapse" method in which the jumper hits with his legs straight out, slightly spread apart. As soon as he feels contact with the pit, he allows his legs to bend and tries to fold his upper body forward and give the effect of almost rolling forward. The arms are swung straight forward, not up.

2. This second device is what I call the "swing out". In this method the jumper lands in almost a sitting position, the same as in the first method, but instead of collapsing his legs, he keeps them straight out and tries to swing his body out sidewards so that at the end of this, he is sitting in the pit in an "L" position with his legs pointed not straight forward, but sidewards. Actually, the jumper has been so overbalanced backwards, that he has fallen back, but instead of falling straight back, he has swung himself around so that the imprint made in the sand by his buttocks is on a level with those made by his feet.

The most important thing in this method is to remember to keep the arms well back at the moment of impact in the pit, then to use them vigorously to swing the body around to a sideward position.

In conclusion, I can merely reiterate my words at the beginning of this article. The things that the jumper should strive for mainly, are a smooth fast approach, and as much height as he can achieve on the take-off. These are the two most important factors in the jump. The success or failure to do either of these will result in the gain or loss in the jump amounting to feet. Whereas the success or failure to perfect a landing or form in the air will never amount to more than six or eight inches. By this, I don't mean to say that the jumper should ignore his landing or his form in air, for many meets will be won or lost by a matter of an inch or two, but he should bear in mind always that speed and height are the two most important factors in the running broadjump.

The Hurdles

BY JOHNNY MORRISS

Track Coach, Southwestern Louisiana Institute, Lafayette, Louisiana

(Now Track Coach, University of Arkansas)

It is a privilege and a pleasure for me to be able to represent Southwestern, the City of Lafayette and the State of Louisiana by being here with all of you today. When I received "Chick" Werner's telegram asking me to be with you fellows, I sincerely considered it an honor for the college and myself. It is meetings of this kind that bring colleges, coaches and states closer together. It gives us opportunities to exchange ideas and to pass on coaching methods.

In track one has to work and, with the exception of the relays, he cannot rely on his buddies, especially in the form events such as the hurdles, which require coordination, intestinal fortitude, speed, timing and above all hard work.

The following remarks come from hurdling and coaching experience. You fellows have probably heard many of them but there may be one or two points brought out in this discussion that may help someone. If anything is said that any of you would like to question or discuss further, jot them down in your notes and we will have a discussion period later.

Hurdling is divided into six parts: **the start, approaching the hurdle, the carriage over the hurdle, landing, between hurdles, and the finish.**

Let's start with a brief discussion on selecting a prospect. If you could select an ideal high hurdler, he would have to be approximately 5'10" to 6'3" tall, weigh from 155 to 180 pounds, be an average high jumper, and run the 100 in at least 10.2 seconds. A boy of this type, by his junior year, would be pretty fair (14.5 or better) especially if he fulfilled the requirements of paragraph 2.

In starting, a beginner in the hurdles should be allowed about three weeks to condition himself, beginning with chins, push-ups and the following exercises, namely, (demonstrate). The following terminology will be used throughout this discussion:

Arm Action—Single or double arm lead.
Lead Leg—Leg that goes over the hurdle first.
Drag Leg—Leg that trails over the hurdles.
Body Lean—Bending from the hips and waist going into hurdle.
Balance Arm—Opposite arm to lead leg.
Off Arm—Same side as lead leg.

After your beginner has worked for about a month and is over his leg soreness, start him on the side stride exercise; if necessary, start on the low hurdles and build him up to the highs. Let one of your better hurdlers take him in charge for a couple of weeks and have him work strictly on the side stride exercises. Do not let him go over the middle of the hurdle until he can handle the side

striding in good form. His timing and coordination should look good.

It is understood most of this work should be done in the fall or in early practice. He has to work by the hour, continuously repeating these exercises and drills. A beginner should work from 30 to 45 minutes daily on exercises and the hurdles. The rest of the work-out should be devoted to work suggested by his coach.

One of the best developing drills in the hurdles, is to set up on the back side of your track a complete string of high hurdles, and on your straight away, a complete string of low hurdles. Have beginners and seasoned hurdlers take the low hurdles three times a day, taking nine strides. Also, take the highs—side striding all of them—at least three times daily. Hurdlers should work on these drills at least three times a week.

When a coach feels his boys are ready for over-the-hurdle work, then particular attention should be devoted to body and arm drive, front leg whip up, back leg drag, and above all, the timing of the balance arm cut-away.

I have three pet sayings, but they are said with qualifications: **"You can't start your arm and body drive into the hurdle too soon, you can't pull your back leg too fast; you can't delay your balance arm too long."**

Make every hurdler conscious of the above suggestions. Show them what you mean by pictures or demonstrations with your better boys. You can never stress this too much, regardless of whether your hurdler is a freshman or a senior.

Let's assume your hurdlers are ready for fast work. The six parts of hurdling will be discussed.

The Start: All sprinter type or shorter legged boys should take eight strides to the first hurdle, whereas, the longer legged or the striders may be able to handle seven strides. I prefer hurdlers to use eight strides to the first hurdle. As a rule, he can develop his speed and have control and balance by the time he reaches the first hurdle. It is my opinion the start is very important in high hurdling, for hurdling requires rhythm, running and jumping worked off of speed, skill, coordination, and timing.

Sometimes it is necessary to change a hurdler's feet in starting. When you have to do this, it becomes necessary to do a lot of starting work on the flat and with a gun. He has to change arm and leg coordination work for especially the first three steps. This requires a lot of effort and thought to change from a left footed starter to a right footed one and vice versa.

A quick cue to remember in stides to the first hurdle is—if a hurdler takes eight strides to the first hurdle, his lead leg will be his back leg in starting—if he takes seven strides then his take off leg would be his back leg.

Often times in early season, a hurdler is stretching for the first hurdle or for his take off area. In this case, place the hurdle at 14½ yards instead of the regulation 15 yards. This will enable him to take the first hurdle without stretching or straining. This should be continued in practice until he is able to stretch out naturally without straining to make the first hurdle at the required distance.

Approaching the Hurdle: It is extremely important in high hurdling that a hurdler be running at about ⅞ speed at his take off going into the hurdle. He should definitely have control of his body at the take off. He should be relaxed and concentrate on the on-coming hurdle. The body should be slightly forward and his eye should be focused on the top of the on-coming hurdle, until the take off, then pick up the top of the next hurdle or the finish line whichever is next.

As soon as the hurdler hits his take off foot, it should be pointed straight down the track, perpendicular to the hurdle. Watch this closely, for a side push off side ways loses 20 to 30 per cent of his driving power; he loses speed, and it sends him into the hurdle slightly off balance or side ways. Ordinarily the take off will vary slightly depending on the height of the hurdler. The take off will vary from about 6'10" to 7'6" in the high hurdles.

The lead leg comes out of a natural stride to lift toward the top of the hurdle. It is lifted with a vigorous motion from the hips. The lead leg should be slightly flexed at the knee. A short legged hurdler will probably use a straight lead leg lay out.

The arm and body drive should start forward as soon as the lead leg starts up. This should be done in a vigorous manner to get the maximum drive or impetus going into the hurdle. Some coaches refer to this as bucking the hurdle.

As to arm action, there are two distinct types: single and double. There are many abbreviated forms of these two. Personally, I prefer the double arm action. In my mind it is much easier to teach beginners and a hurdler does not have to have as much coordination using the double arm action.

The carriage over hurdle: The arm action, front leg, and back leg drag plays a very important role here.

Discussing the front leg lead, the toe should be turned down, heel up towards the achilles tendon, knee flexed. The lead foot should be whipped toward the top of the hurdle but slightly off center. The hips and trunk of the body should go over the center of the hurdle.

The arms should be thrust in a vigorous manner toward the lead leg. Assuming that the left leg is the lead leg then the right arm or balance arm should be fully extended with the palm of the right hand parallel to the track, the right hand to be about a foot away from the hand and extended slightly beyond left toe, the left arm or off arm is slightly flexed and the hand is not fully extended, but rides at about ⅞ length, palm down in a relaxed manner and the left hand is not more than six inches away from left ankle.

The drag leg comes out of its natural stride, the foot should push straight off the track and be fully extended to get maximum drive. The lift starts slowly, with the knee above the foot and a gradual pull from the hip. When the drag leg knee gets about eighteen inches from the top of the hurdle the pull becomes vigorous to help accelerate the body over the hurdle.

At one time over the hurdle there is slightly a dead pause, where the lead leg is almost at full length, arm and body drive in its lay out, the drag leg, knee and foot, all are almost at right angles. There are three things that can carry a hurdler through this pause and help him over the hurdle. One is his momentum into the hurdle, the other a fast back leg action, perfectly timed, and the lead leg snap down acompanied by "body dip."

Landing Over Hurdle: Front leg snap down, balance arm cut, and back leg pull through.

The front leg snap down plays an important part in coming off the hurdle; however, a beginner has to be careful using this, for it will whip him off his feet, throw him off balance, make him raise his body too fast or land on his heel if not timed properly. A good hurdler should ride his body drive and his momentum out until he feels that his buttock is right over the top of the hurdle. Then he should whip his front leg down, retain his body lean, start his balance arm cut and complete his back leg pull through. This should all be timed so well that when the lead foot lands, the body lean is still forward, his balance arm should be about half way through its cut, in a down and out manner, the drag leg pulled through vigorously from hip, the knee should be higher than the foot with a reach out manner. When the front foot lands the balance arm and drag leg should be at least half way through their respective cuts.

Between the Hurdles: When the hurdler lands on his

lead leg, his balance arm, body lean, and drag leg should be timed perfectly so he is in running position. Arms should be pumped like a sprinter; he should retain his body lean between the hurdles and his eyes should be focused on the top of the on-coming hurdle. A hurdler should concentrate on hurdling, by all means never let your mind wander or your eyes drift out of your running or hurdling line.

The Finish: When the hurdler comes off the last hurdle he should immediately focus his eyes on the finish line. As soon as he can attain his balance and body lean, he should shorten his stride and run like a sprinter through the finish.

Low Hurdles

Running the low hurdles has changed a lot in recent years. It has became more of a sprint race than a hurdle race. However, there are many points a sprinter has to learn about the low hurdles. He must learn how to go into a hurdle and come off of a hurdle in balance. This requires coordination and timing.

Frequently a high hurdler will develop into a good low hurdler. However, the ratio is small. Only about two out of five will become top notch low hurdlers. Therefore a coach's only alternative is to take a sprinter or a quarter-miler and teach him how to run the low hurdles.

All prospective low hurdlers should take as many high hurdling exercises as they can do. If they cannot do them on a high hurdle, then they should be taught to do them on a three foot hurdle. The one exercise that they should definitely learn is the side stride exercise. Any hurdler must have good timing and be in stride coming off the hurdle. However, there are always exceptions to this rule. If he can run a two-twenty in twenty and six-tenths seconds, or better, all he has to do is run between the hurdles and jump them any way that he can. However, there are very few coaches blessed with this kind of athlete, so a lot of work has to be put on their prospects.

Usually your low hurdlers come from your second or third best sprinters and quarter-milers, provided they are fairly tall, or from high hurdlers. Other times you get combination men, such as, high jumpers, and low hurdlers. Since the low hurdles are run near the end of a meet it is usually a good policy to have a fair man who is fresh.

In early season work, it is suggested that you take your sprinters, four-forty men, high jumpers, pole vaulters, broad jumpers and high hurdlers. Show them some of the hurdling exercises which will loosen them up. After two weeks of this early work, show them how to side stride a low hurdle or a three-foot hurdle, teaching the correct pull through of back leg and balance arm cut. Give them an idea about where they should take off and where they should land over the hurdle. Show them how to whip their front leg up into the hurdle. Have them practice this over the side and over the top of a couple of hurdles. When they look like they can handle this work fairly well, then the coach can give them more work.

Place ten low hurdles on the track at the correct spacing between the hurdles. Some beginners will look very poor. Take them aside and point out their faults. If they run these ten hurdles easy, three times a day, at least three times a week, you will notice tremendous improvement. Concentrate on these things: a good lead leg in striding form; balance coming off hurdle; the drag leg pulled through and balance arm cut timed correctly.

Checks on fractional distances used are: Eighty yards, eight and eight tenths to nine and four tenths, one hundred and twenty yards, with five hurdles, if your prospect runs thirteen and five-tenths seconds, or better, he is doing fine. One hundred and sixty yards, taking seven hurdles; eighteen seconds, or better. Two hundred yards, taking nine hurdles; twenty-three seconds; all checks should have a twenty yard finish.

If your hurdler can keep within the above figures, he will be able to run a low hurdle race in twenty-four and five-tenths seconds, or better, without any trouble. He should be given at least three of these checks prior to his first competition. One of these should be over the two-hundred yard route.

Any time a check is given to your low hurdlers, the correct yardage from the last hurdle to the finish should be run. In this way he is always practicing that drive coming off the last hurdle and running to the finish line. He is less likely to hit the last hurdle. This is a very important factor in the outcome of any race. If this is done in practice, it becomes a habit in competition.

When fractional checks are given, you know about what your hurdler, or hurdlers, are doing at all times. In this way their confidence is being built up and their desire to improve is always there.

In taking a low hurdle fast, the take off is approximately the same as a high hurdle (about seven feet). The lead leg is whipped up faster and more forward, but not as high—more in striding fashion.

The body lean is not as exaggerated here. However, there is a definite dip, with a balance arm thrust. A single arm action should be used in low hurdling.

The balance arm is driven toward lead leg, but is about a foot higher than lead leg toe, and about a foot to the side. When the low hurdler feels his lead leg thigh on top of the hurdle, he should start his front leg snap down, with his balance arm starting its cut, and a fast pull should be started from his drag leg hip. The balance arm cut on the low hurdles is cut more down toward the ground, and not quite as wide as in the high hurdles.

The drag leg is pulled through sooner and faster, with a reach out. The front leg snap down hits the track a little closer to the low hurdle. The body lean is retained as much as possible for the forward drive, coming off the hurdle.

Be careful; do not let your hurdler hook his off arm behind his back. Keep the elbow bent and try not to let him get his off arm and hand any farther back than his hip. In this way, it will be in coordinated running position.

From the last hurdle to the finish, the strides should be shortened, and he should go into a sprinter's stride, with drive through the finish line.

Background work or over-distance work, along with fast short work for low hurdlers, is important. This type of work should be alternated with slow work on the hurdles. Good over-distance work, along with hurdling, is to have your prospect run a four-forty string of three-foot hurdles. In doing this, nineteen strides should be used. In this way, he is getting striding work down, which is consistent, and getting hurdling too.

Beginners may have trouble at first taking seven strides, all the way, in a low hurdle race. The safest thing to tell them to do is, carry seven strides as long as they can, but as soon as they have to stretch to make a hurdle, then on that hurdle coming off of it, cut down on the first two strides and go into nine strides between the hurdles. In doing this the hurdler will not have to waste half as much time. However, if he continues to stretch for the next hurdle, one of three things will happen. First, he may jump into the hurdle, hurt himself, or fall. Second, he will get up on top of hurdle and realize he cannot take it correctly, and have to jump it with wrong foot. Third, he will come up to hurdle, then start chopping strides and almost have to stop to take the hurdle. So, the first suggestion is the lesser of three evils.

In the low hurdles, there have been some good hurdlers who have alternated legs, taking the hurdles. However, there have been very few. If over distance work is given, or some of the above suggestions are used, a low hurdler will not have any trouble taking seven strides over the hurdles unless he is a short-legged hurdler, or he has done a lot of doubling, or has had a lot of heats to run.

The low hurdle race is a tough race. It requires speed, endurance, coordination, and good timing. However, if a boy has an average amount of ability and the desire, he can become an average low hurdler.

Four-Forty Hurdles

The four-forty yard hurdle race is probably one of the most gruelling races a track man can participate in. It requires hurdling ability, endurance, stamina, speed and intestinal fortitude.

In selecting candidates to run these hurdles, a coach has to pick a boy who is a good four-forty yard runner, or one who can run the eight-eighty well. The former should be able to run fifty seconds or better; the latter one fifty-six or better. An ideal combination would be a fairly good low hurdler and a pretty good four-forty man. Of course, these ideal boys do not come along too often, so most of the time you have to start with beginners.

However, if you have a boy who is fairly tall and is only your second or third best four-fourty man, or is not your top man in the eight-eighty, then you have something to work on.

Then, on the other hand, you may have the same two combinations, and you realize they have just about reached their maximum in the four-forty or eight-eighty. These boys will probably never be nationally recognized as "greats" in their own events. However, with a little extra work on the intermediate hurdles (three feet), they may become national champions, or make the Olympic team.

In starting a prospect, or prospects, to work on the four-forty yard hurdles, who has not had any work on the hurdles, he should be given the high hurdle exercises and be worked with as a beginner.

While he is being shown the hurdle exercise, the main part of his work should be running, especially pace work, such as, two-twenties in twenty-eight seconds; four-forties in fifty-eight seconds; six-sixties in one minute and thirty-five seconds; half miles in two minutes and fifteen seconds.

Hurdling exercises should be continued each day for half of his workout schedule. When he starts to round into shape, speed work should be added, such as: One hundred and fifty yards, three hundreds, three-thirties, and three-sixties. Setting up pace times to hit.

When your prospect, or prospects, can take the low hurdles fairly well, then he should learn to do the side stride exercise over the itermediate hurdle (three feet). Have him repeat this work many times, using the single arm action, paying close attention to the back leg pull through, balance arm cut, and the timing of body and arm thrust, going into hurdle, and coming off hurdle. Watch off arm. Do not let him hook it behind his body.

In running the intermediate hurdles, the form of a high hurdle is a little more in effect. However, the timing, coordination, and closeness of clearing the hurdle, are not quite as important. However, he has to hurdle this intermediate hurdle and cannot stride it as he can a low hurdle.

Have your prospect jog around these hurdles, taking nineteen strides between the hurdles, paying close attention to taking the three foot hurdles correctly. These should be taken at least six times a week as part of the warm up. This is given as part of the daily work schedule.

In the four-forty hurdles, like distance running, pace work is very important. Of course, attention to hurdling form and correct strides must be emphasized. Therefore, a lot of this work has to be given.

The natural tendency of all four-forty hurdlers is to start out in the first few hurdles too fast. It is very important that they check strides throughout the race. Also, that they run pace, keep their wits collected, and use good judgment at all times. Pace work should be given constantly until they have a groved stride to the first hurdle and in between the hurdles.

After the hurdlers have had the above work, the coach should let them try to carry the complete four-forty, using seventeen strides. If they can carry the complete distance, using the suggested number of strides, they should run about sixty two seconds, or better.

This, naturally, is not a good four-fourty hurdle race, but for beginners it is pretty fair. A foundation is being built up and a background of endurance.

It is best not to go into fifteen stride work between the hurdles until the prospect, or prospects, can carry the whole distance, taking seventeen strides between the hurdles.

Work off of starting blocks should be used when fifteen stride work is begun. From the start to the first hurdle, eighteen strides are used. In running the hurdles taking fifteen strides, the hurdler has to use a long, pulling stride, and try to be as smooth as possible in his running. This is equivalent to taking seven strides between the low hurdles. Consequently, more power has to be put into his running.

When work is begun on the intermediate hurdles, taking fifteen strides, the same pattern of work listed above should be followed. Have the hurdler, or hurdlers, run over three hurdles fast a half dozen times. Correct them, and have them work on smoothness and effortless running, especially in the first few hurdles. Then it will be possible for them to swing the early part of their race without pushing themselves until they have to.

A lot of pace work should be given for two-hundred and twenty yards (five hurdles). The pace two-twenties, should be hit in about twenty-five and five tenths seconds. This should be practiced many times so the hurdler will know what he is doing and get used to hitting correct pace. In doing this, he is worked just like a four-forty or eight-eighty man, setting up early pace work.

When the hurdler, or hurdlers, have gotten this pace work down and are fairly consistent, then lengthen the pace work out to three hundred and sixty yards, taking eight hurdles. This work should be repeated many times, until your hurdlers can carry this distance, taking fifteen strides between the hurdles. The pace time here should be forty-two and five-tenths seconds.

If hurdlers can carry this far in good shape, they can certainly carry the last two hurdles in fifteen strides. However, if they cannot, then it is suggested that they go into seventeen strides coming off the hurdle they have to stretch for. If a coach gives his hurdlers a lot of pace distance work, and a lot of the above hurdle pace work, they certainly should be able to get through a complete string of four-forty yard hurdles in a couple of years. However, the hurdlers have to be brought along up to this pace.

If hurdlers can carry the above suggested pace, they should not have any difficulty in running fifty-three and five-tenths seconds or better. However, if they have to go into seventeen strides on the last three hurdles, they should run fifty-five seconds or better.

Now, in running the four-hundred meter hurdles, the distance to the first hurdle is a little longer. Hurdlers may have to take nineteen or twenty strides to first hurdle. However, the distance between the hurdles is a little shorter. This should help them some with their strides on the last few hurdles.

Many coaches will say that the above work takes too much time. It takes time away from other boys. To a

certain extent this is true; but if you have a group of boys doing the above work, you will have great low hurdlers, better than average four-forty men, good two-twenty men, and some will run a pretty good half-mile. In the long run, you will strengthen your squad instead of feeling you are neglecting them.

While I am up here I might as well put a plug in for our part of the country. I would like to tell all of you coaches about our Southwestern Relays which are held yearly at Lafayette, Louisiana.

1948 Figures	1949 Figures
7 colleges and universities participated	14 colleges and universities
145 college athletes	303 college athletes
25 high schools (all from La.)	46 high schools from Texas, Arkansas and La.
370 high school athletes	524 high school athletes
Crowd 2500	Crowd 4500

Our 22nd annual relay date this year will be Saturday, April 15th. High school trials in the morning, college trials in afternoon and finals at night. We do not guarantee any expenses, but we do furnish housing and arrange for pre-meet training meals.

In closing it has been a pleasure being with you all and I hope some of you can be with us at the Southwestern Relays on April 15th in Lafayette, Louisiana.

Board Track Technique

BY JOE YANCEY

Coach, New York Pioneer Club, New York City, N. Y.

Even to great and experienced outdoor runners, the difference between indoor and outdoor running is amazing. Everything indoors conspires to make the runner use his brain and track generalship excessively. In short, indoor running demands of the competitor the highest coordination of mind and muscle.

Fundamentally, that is pertaining to "just running", the things to remember are body positions in running turns, stride lengths as one approaches turns, running the straightaways and floating the turns. In running the turns, one must have a certain lean that can sustain his speed and at the same time permit him to negotiate a frequently sharp turn without falling or losing one's balance. (This fact is better demonstrated than talked about.) Because the straightaways are unusually short, in comparison with the outdoor back and home stretch, the runner must be able to get full use of his stride, and at the same time, know how to graduate his stride for a longer one as he approaches the turn. This is particularly important on the flat armory floor, for the runner who sprints the turn will appear like a dog running around a fast and slippery corner, getting nowhere fast. With the shortened stretch and smaller circumference, the need for running (speeding up) the straightaways is obvious.

Under the heading of track generalship are the most distinctive factors that separate the good indoor runner from the poor one. In the wide open spaces, natural ability, free wheeling and the track width may permit a runner with not too much track generalship to win. Not so indoors. The mentally alert runner indoors will always (or nearly always) make the correct decision and execute it immediately. For example, he should, when running behind a competitor, split the fellow's back, that is run off his shoulder. However, if he discovers that the fellow he is tailing runs unnecessarily wide on the turns, the mentally alert runner will ease a little and bolt past the leader on the inside, thereby saving precious energy. The other advantage of "splitting" the competitor's back is in keeping from being boxed, the great plague of indoor runners. By sticking out just a little, as he splits the back, the runner presents a costly price to his would-be boxer; that is picture a leading runner and a second man who is tailing him just off his shoulder. A third runner comes up on the stride or pace. The second runner will then—if he is wise—move up abreast the leader and will either go around him (the leader), make the third runner go all the way around or face the third runner to drop back to his original position. Otherwise, if the second runner is tailing directly behind the pace setter, the third runner may run just off the shoulder of the leader and box the second runner hopelessly. He then may have to wait until that entire line passes, before he can get out and get back in the race.

The most important factor in running indoors is "Position", on the pace. Particularly in the shorter middle distances, the runner should break fast and assume a position no worse than second or third, according to the number of athletes in the race and the caliber of the competitors; and should stay in position close enough to the pace; if he has not already assumed the lead, to make a real challenge at the bell lap. If one runs way off the pace, he simply spends his energies when he sprints to catch up, then attempts to sprint with the leaders, who have been free-wheeling until they gather themselves for the all out dash for the tape. (That is one yard the other side of the tape.)

The runner should run with poise and relaxation, maintaining his form from gun to tape, spurting and jockeying for position, despite the runner's condition, merely tend to drain much needed energy when he is ready to make his final bid. Position is of greatest importance to successful indoor racing.

Generally speaking, there are three major handicaps in indoor track, first off, one cannot emphasize too much the necessity of our athletes getting out in the morning to inhale fresh air into their lungs that are somewhat depreciated in the closed indoor asylums. Another handicap is the fact that too few colleges and clubs have access to banked tracks to train on, obviously since indoor track presents a bit different problem to the runner, it would be the ideal situation to train on a banked board track.

The third handicap is that due to the narrow width of the track, most races are limited to the number of athletes that can compete. Many college and club coaches with large squads, find it difficult at times to make selections of one or two athletes to compete in an event, in certain cases some athletes have few if any opportunities to run on a banked track.

In conclusion I wish to state that there is, "Nothing New Under the Sun," all a matter of individual technique, application, personal experience, mental alertness and good old fashioned horse sense. There are many patterns and solutions to be followed in indoor racing, the right decision at the right time executed immediately with success, is the correct pattern, or solution.

Timing

BY THOMAS F. LENNON
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Mr. Chairman, Gentlemen, there isn't much that I can tell you about the technical side of timing for, in truth there isn't very much to it except good eyesight, fast reflexes, the ability to keep one's eyes open without blinking for fifteen to thirty seconds at a time and lots of experience. Blinking while waiting for the flash of the starter's pistol might result in missing the flash and that would mean that the timer would be off at least 1/10 of a second.

There are, however, certain practical aspects of timing which might interest you.

In the days before the tenth second watch, timing was a very expensive hobby. In those days a timer's required equipment was at least one fine fifth second watch, the cost of which ran into the hundreds of dollars. Some timers had two or more such watches. The cost of maintaining each of these watches in perfect condition was $25.00 to $75.00 per year. Such watches were manufactured by only half a dozen or so world famous watch makers such as Patek & Phillipe, Constantin & Vacheron, Jergeson, Agizzi and others, names which the older men among you will recognize.

Timing, as is the case with all other officiating, is still an expensive hobby, except now the timer is spared the expense of buying an expensive watch, since today in the majority of important athletic meets watches are loaned by the manufacturers and are maintained by them in between meets. Thus the timer is now relieved of both the initial cost and the maintenance cost of these watches, a not inconsiderable item.

In the old days, the inability on the part of the prospective young timer to meet these costs, brought about a condition under which it was very difficult to develop expert timers, and the result was that the services of the same groups of timers, in various parts of the country, were called upon week in and week out, to time track, swimming, boxing, wrestling, rope climbing, speed typing and the like contests. Thus adding another item of considerable expense to the time.

Today, thanks to the generosity of the manufacturers in loaning watches, a host of new timers is constantly being developed all over the country, and, instead of a few, there are many expert timers competent to plan and execute in the role of chief timer the timing, of any kind of contest.

As you know, the general public has absolutely no concept of the amount of time, work and detail necessary to plan, and to put on, a big athletic meet. I'm sure it may surprise some of you to learn the amount of work required for only one detail in connection with an athletic meet, the timing of such an event.

For example, take the Pennsylvania Relay Carnival. During the course of, or following, this annual event many of you gentlemen have asked for and have received promptly the split times of each member of each of your relay teams. To be in possession of this information, not only for athletes, coaches, managers and also the press, it was necessary, at last year's Carnival, for the timers to record during the two days of the meet, no less than 3,277 separate clockings. In each relay race there were at least six teams split timed (in the more important events all teams were split timed), so that in each relay race there were at least twenty four separate split clockings plus the four clockings necessary on the winner making a total of at least twenty eight split timings on every race.

Since the races follow each other in such rapid succession, it is necessary in the planning of the timing to provide each timer with his assignments for both days in advance of the meet. Since the recording of the times takes time also, it is necessary to have two teams of timers of six men each who work alternately on races. Thus while one team of timers is occupied in recording the times of the race just finished, the second team is ready to time the race coming up. Often, more than six teams must be split timed in which event timers are borrowed from one team or other and in which event the borrowed timer holds the time of the race just finished on one watch and starts a second watch on the next race. This means that a given timer, having been assigned in advance, his work for approximately every alternate four minutes, and in some cases succeeding events for the two day period, it is almost impossible for him to obtain permission "to leave the room." Hence he is careful of his fluid intake before the start of the race, or else.

You may be interested in the actual procedure in the planning of the timing of the relays and other big meets.

In the case of the relays, several days prior to the meet Jamie Swarts, director of the meet, sends to the chief timer a carefully checked galley proof copy of the program of events on which he notes which races will be decided on a time basis and in which races teams will qualify for the final on a time basis. From this proof the chief timer starts the make-up of his timing book, and as a first step, he makes up his timers teams, assigns the timers to their events by number, and designates the places in each event which each timer will time. On the night before the opening of the games the chief timer and some of his assistant timers meet in Philadelphia with Mr. Harry Schwartz, who many of you will recognize as the chief press steward and who is a veritable encyclopedia of information regarding the respective abilities of school and college relays. This meeting is for the purpose of attempting to pick the six teams in each relay most likely to finish in the first six. Incidentally, and I will not be resentful if there is some eye brow raising on this one, Mr. Schwartz's picking has been better than 97% perfect during the past several years.

Following this picking of the chief timer then assigns the teams in each relay to be split timed by each timer. Cards are then prepared for each timer listing all of his assignments for the entire two day program. This preparation last year took approximately 14 hours on an over-all basis.

To make sure there is no misunderstanding as to assignments and to answer any questions, a meeting of the timers is held at 11 A.M. on Friday morning of the meet in the field house on Franklin Field and the whole thing is gone over in detail. The result is that each timer knows exactly what he is to do during every minute of the two day program.

Of course, timers like every one else have their pet peeves and with the timers perhaps the chief peeve arises when the meet directors decide that qualifications in sprints and hurdles shall be on the basis of one and two in each heat and the fastest third, or the winner and the fastest second, or some such combination. This is not only unfair to the athlete but more often than not results in a shower of abuse on the timers heads by athletes, coaches and the press.

Draw in your own minds three vertical lines and

think of the second line as being three feet from the first and the third line three feet from the second. The distance, therefore, between the first and third lines is six feet. Now consider these lines as intervals of 1/10 of a second, the first line being 1/10, the second 2/10 and the third 3/10. Now assume that there is a runner just over the 1/10 line and another runner just inside the 2/10 line. In this case one runner is almost three feet ahead of the other but both are within the same 1/10 interval of time. Now put one runner again just over the 1/10 line and a second runner just inside the 3/10 line. Now one runner is nearly six feet ahead of the other with only 1/10 of a second difference in time interval. Now put the first runner just inside the 2/10 line and the second runner just over the 2/10 line. In this case one runner may be ahead of another by only six inches but again there is a difference of only 1/10 of a second in time interval. Thus one runner may beat another by approximately six inches or nearly six feet with the same difference of only 1/10 of a second in time interval. Many important places for points have been lost by this unfair and impracticable method of qualification and if you coaches will squawk when this circumstance arises, the practice will soon stop to your benefit, and more important to the benefit of your athletes.

I am happy to report to you that at a meeting of a joint committee composed of N.C.A.A., I.C.4-A and A.A.U. representatives this morning, which committee is working toward the standardization of rules as among these three bodies, this matter was considered and a motion made, duly seconded and carried unanimously. The joint committee will recommend to the N.C.A.A., I.C.4-A and A.A.U. that there shall be no advancement to semi-finals or finals on a time basis in any race up to and including 440 yards.

The stopping of this practice should also have a marked change in opinions with respect to the eyesight of timers in general.

Thank you.

Sprinting

BY JESS HILL

University of Southern California

In introducing the subject of sprinting in track and field, I believe that a few remarks would be pertinent relative to the physical and mental characteristics so necessary before an athlete can expect to become an outstanding sprinter. In the first place, there seems to be no special body type as we have had great sprinters in the past who have been rather short in stature, some have been of medium build and still others have been of the tall rather well built type. So it would seem that the physical make-up of a sprinter is not so important as certain mental-physical qualifications. The first of these, and without exception, is that the man must possess a very quick reaction or short-reflex time. He must be of a nervous high-strung type who is able to react very fast to the starter's gun and be able to move his legs faster. In fact, the ability of fast leg action derived from a mental-physical heredity is one of the most priceless possessions as far as sprinting is concerned. Naturally, too, in all athletic competition he must possess a burning desire to become a sprint champion and be willing to pay the price so necessary for success.

As I have said, we have had all types of sprinters of which there are two main types—the floater, and the driver. The floater runs very relaxed and very smooth with very little pounding on the track and with leg speed his principal asset. The driver type depends primarily upon drive or bounce and must of necessity possess a very high knee action.

In discussing proper running form, I believe the following fundamentals are of extreme importance.

1. The body or sprinting angle should be approximately 20 degrees from an erect position, but this will vary slightly in individuals.
2. It is necessary to have the weight over the power in more or less of a rocking chair sitting position.
3. A straight line must be maintained on this angle from the back of the head to the heel.
4. The head is in a relaxed position with the chin on the chest.
5. The shoulders should be relaxed and low with little or no swinging or hunching of the shoulders.
6. Arm action
   a. Very relaxed and forming an angle of about 90 degrees with the palms inboard or facing the body and not clenched.
   b. In the swing to the front the hands go up approximately shoulder high and approximately to the back of the hip in the rear. An exaggerated arm action is usually inefficient.
   c. The arms do not swing across the chest.
   d. Elbows should be kept close to the sides on the swing or poor arm action results. The 90 degree angle in the arm is always maintained.
   e. Hands relaxed with the thumbs up.
7. Knee, hip and foot action
   a. Knees raised rather high directly in front and not out to the side.
   b. A definite attempt should be made to bring the foot from the ground for the stride eliminating excessive kick-up behind. Ordinarily the higher the knee action, the less kick-up behind and be sure that the knees are relaxed and not tense for a good snap down.
   c. Pointing of the toes in or out or twisting them when they strike the ground sometimes results in a loss of power; however, toeing out is by far the worst fault and should be entirely eliminated if possible.
   d. The feet should strike the ground about 4 inches apart with the toes and heels in a straight line with the sprinter being well up on his toes and the heels never touching the ground.
   e. Any unorthodox movement of the feet or legs out of a straight line should not be tolerated.

In consideration of the proper starting technique, it is well to remember that sprinters in the past have used variations of starting fundamentals, many of them with great success, so it seems that in determining the type of start that a sprinter is to use everything should be aimed at improving his speed in running the first 10 yards. Rather than becoming too set upon starting fundamentals, we should remember that there are physical and mental variations which will enable one man to use a slightly different form than another with equal success. I have

always favored the medium type start rather than the bunch start. In the medium start the front foot is placed somewhere between 8 and 14 inches from the starting line with the knee of the back foot placed opposite the ball of the front foot in a kneeling position. When assuming this position it is well to remember that the weight of the body should be both upon the hands, front foot and the knee that is on the ground with the sprinter never settling back upon his haunches as this has a tendency to create undue tension in the leg muscles that may inhibit quick reaction time on the start.

The position of the hands and the arms is also rather important with the fingers being placed just behind the starting line in a tripod position but with no attempt being made to balance on the tips of the fingers. The arms are fully extended, approximately shoulder width with little or no flexion at the elbow and with the arms perpendicular to the ground in an "on your marks" position.

Most sprinters ordinarily will have the head slightly up but not tense with the eyes focused about 8 yards down the track. However, we have had favorable reactions with the eyes of a sprinter looking straight down at the place the first step will be taken.

The fundamentals of the "get-set" position. The knee of the rear leg is raised about 4 or 5 inches off the ground with the body moving forward to a natural position which will bring the shoulders above a point just beyond the starting line. In assuming this position, it is quite important that the sprinter come up to the get-set position rather slowly. I believe that the weight of the sprinter in this position should be placed on the front foot and the hands with very little or no pressure on the back foot in the starting block. With this type of start the back of the sprinter is just about parallel with the ground.

The "gun" fundamentals vary in different types of sprinters but I like to see the back foot brought forward as low as possible to the ground and placed as far out in front as comfortably possible. (In this respect Mel Patton's first step was as much as 30 inches in front of the starting line.) But, in order to do this, the hip must play an important part. The arm on the side of the forward leg is thrust at right angles slightly across the chest with the hand at about shoulder level. The body is slanted well forward and any tendency to jump straight up in the air can be eliminated by constant practice upon not reaching an erect sprinting position until at least 8 to 10 yards from the starting line. Under this type of start I think we will find that the sprinter will run out of the blocks and not lunge out as is so commonly the case and which in my humble estimation results in a fraction of a second of lost motion.

In running the 220 very little attention need be given to the breathing habits of the sprinter but in the 100 yard dash we attempt to have the sprinter take 4 breaths, one at the get set command, another at about 35 yards, another at about 60 yards, and another between 80 and 85 yards for the drive through the finish tape.

Starting practice should never be held too early in the training program and should not be conducted during extremely cold weather and never when the sprinters are excessively tired. We never use gun starts on Monday but usually confine all starting practice to Tuesday and Wednesday afternoons. I firmly believe that if a man is going to be able to react to the gun, he must have plenty of starting practice and I try to have my men take about 10 gun starts on Tuesdays and Wednesdays, in the afternoons, with no horseplay being allowed and none being allowed to start with the sprinters except high hurdlers, low hurdlers and quarter milers.

I realize that my remarks have not been too profound and contain very little that you haven't heard before, but it is a pleasure to meet with you and have the opportunity of learning from you how things are being done elsewhere.

The Javelin Throw

BY JACK WEIERHAUSER
Stanford University, Stanford, California

It is my contention that the form used by champions should not be slavishly copied, rather their form should be studied in order to see how they employ the fundamental principles which all good athletes use. The mere fact that an individual is a champion proves that he has certain gifts that other athletes do not possess. A champion is an exceptional athlete, therefore the run-of-the-mill competitor should not attempt to copy his idiosyncracies nor the details of his form. Rather, as stated before, he should make a study of how the champion better utilizes the fundamentals of which we shall speak later.

In the case of Franklin (Bud) Held, Stanford's three time N.C.A.A. javelin champion, he had never thrown a javelin before coming to Stanford, and yet, so great were his gifts, that he won the West Coast Relays as a freshman, with a throw of 212'10¾" beating Seymour, Biles and Likens. Needless to say, Held has an arm and back muscled in a manner the like of which few athletes possess. His arm is very fast, so fast as to be a blur in slow motion pictures. His form as a freshman and sophomore left much to be desired, but after failing to gain a place on the American Olympic Team in 1948, Held studied his form and the flight of the javelin in the air, and worked hard all fall and winter of his junior year. I believe this pre-season work led to the great improvement in throwing form shown during his last two track seasons here at Stanford.

Stripped to bare essentials, success in the weight events is due to one thing—speed of the implement as it leaves the hand—in other words, "the muzzle velocity." This initial velocity may be mathematically figured. Engineering students have arrived at the figure of 30.6 feet per second for the shot to travel 50 feet, 63.5 feet per second for the discus to travel 150 feet and 77 feet per second for the javelin to travel 200 feet. These figures assume that air resistance is negligible, line of flight is correct, etc. The point I am trying to bring out is that form and strength are not important except for their contribution to the one thing—muzzle velocity of the implement. If this fact is accepted, we can approach the problem from this angle: If a certain movement of the body adds to this speed, it is good; if not, it should be eliminated. In the case of the javelin throw, we can therefore say, the run is only to gain momentum of the body and of the javelin. The javelin must gain momentum during the run, must continue in momentum and at the time it is actually thrown, should be moving forward at a certain rate of speed. It should not stop and should not change the plane of its throw. For this reason, it is very important that the javelin be in throwing position when the athlete himself is in the proper fundamental throwing position.

Proper body position is gained by use of the cross-over; just as in the shot put, body position is gained at the back of the circle and putting position is gained on the drive across the circle. The cross-over gives the athlete time to let his body weight get back on his rear leg so that he uses his entire body for the actual throw. From this position, the leg, the hips, the stomach muscles, the shoulder, the arm and finally the wrist, get into the actual throw. We use the strong muscles of the leg and torso to give the initial punch, then as the javelin gains in velocity, the smaller and faster muscles take over until finally we get to the actual finger flip.

The importance of proper body position is very aptly illustrated by Likens of San Jose State, who won the N.C.A.A. Championship in 1946 and 1947 and had a best mark of 226 feet. This fine athlete did not use a run. He stood about 25 feet back of the scratch line, hopped, threw, and used a follow through; in other words, practically a standing throw. His body position was so excellent without the run that he managed a third in the 1948 American Olympic tryouts. Picking up just enough momentum on the hop, he could get his weight so far back on his rear leg that he put his entire body into the throw. When Likens attempted to throw using a run as other javelin throwers, his best mark was somewhere around 175 feet. He added momentum to his body and to the javelin but his body position was so far forward over his front foot, that only his arm took part in the actual throw.

As stated before, the cross-over step is most important because body position is gained by this action and yet, the momentum of the body due to the run is not stopped. The cross-over is a vigorous leg swing with the drive off the left leg. There is no hurry to get the right leg back on the ground. It is very necessary that the actual throw of the javelin be started before the left foot touches the ground. The elbow should start its bend before the left foot comes down as is illustrated by the accompanying photos of Held. This cross-over is not magic, it is only an action to transmit the speed of the run into the fundamental throwing position which has been described before. It is important that the javelin be in throwing position at least one stride before throwing position of the body is gained. Let me stress at this point, that although we continually describe the fundamental throwing position, it is a passing movement, not a static movement. The athlete assumes his position but immediately goes into the throwing action. He does not stop at any time in this position.

The angle of the javelin's flight is important, ranging from 40 degrees to approximately 50 degrees with most good throwers averaging around 45 degrees. Seymour probably has the highest angle of flight of any American javelin thrower; whereas Pickerts, of Santa Barbara State, probably has the lowest. The flight of the javelin and the line of applied force of the throw must be along the same axis—from the nose to the tail of the javelin. Tell your javelin throwers to attempt throwing through an invisible knothole about 25 feet up in the air, the throw being made so that the javelin does not touch the sides of the knothole. Just as a baseball pitcher controls a curved ball, so must the javelin man control the javelin in its flight through the air. He must seek to have the spear level at the highest point of flight. Held always contended that a slim tailed javelin helped in getting this level position.

Since the initial punch is given with the large muscles of the body, there must be a body snap pulling the shoulder forward in unison with the forward motion of the javelin. The hold on the javelin should be relaxed; a point ably brought out by Seymour in his lecture at the coaches meeting last year. With the arm in a relaxed position, the shoulder gives the initial pull, pulling on the limp arm as though the arm were a piece of rope. This

Approaching mark—overhead carry.

Start of javelin being brought back.

Long easy strides. Start of weight shift back. Note hips face forward, right shoulder starts back, javelin completes back swing.

Note relaxed position.

Start of crossover.

Crossover—hips face forward, right shoulder back and down. Throwing position is gained by this action.

Right foot landing after crossover. Note arm is not fully extended. Preferable to have javelin pointed in line of throw.

Excellent landing position. Note length of stance—left foot not yet landed, yet arm has started the throw. This position was gained by proper crossover.

Start of throw.

Hips snap forward pulling right shoulder forward. Note relaxed right arm. Elbow leads. Preferable to have right foot remain on the ground trifle longer.

Completion of throw at height of arm. Note rise up and over the left leg action.

Follow through.

Note length of follow through step straight ahead.

aids in giving the initial start to the javelin, then the shoulder and arm muscles can take over. I believe this action is similar to that used by shot putters.

The wrist is held fairly rigid until the javelin is well through its flight and the elbow is even with the ear. If the wrist is allowed to cock at the start of the throw, the point of the spear rises and the force of the throw pulls down on the middle of it. If the wrist is locked at the beginning of the throw, as the elbow comes forward the wrist is cocked and the actual flip of the wrist is along the axis of the javelin.

The follow-through must be up and out over the left leg. Emphasize that up and out action very strongly. The throw must be made with the left foot approximately 8 to 10 feet behind the scratch line, in order for the thrower to have the feeling of plenty of room for a follow-through. This feeling of being too close to the scratch line is a great hindrance to any follow-through and almost inevitably results in the javelin thrower going to the side—a right handed thrower finishing to his left. This was the case of Bud Held in the latter part of the season last year, when the combination of a sore arm and five labs in a week kept him from working out during the week and correcting this mistake. Merely moving the check mark back does not correct this fault because the javelin thrower feels he is too far behind the scratch line and will take one or two longer strides, bringing him back to his former position, which was too close to the line. I believe this fault is a common one with javelin throwers and difficult to correct. The best time for correction is in pre-season practice. We try to have the athlete throw so that he has two or three feet leeway after his follow-through. Two or three feet at the start of the throw is worth possibly fifteen to twenty feet at the end of the throw. This can be used as a coaching point.

As Wilbur (Moose) Thompson discussed at the clinic last year, force and strength are not the same thing. Force applied over a shorter interval results in a faster initial velocity to an implement, whereas strength does not add to this burst of effort.

The accompanying photos of Bud Held in an actual competitive throw of 225 feet, illustrate some of the points described in this article.

Distance Running as it Pertains to Don Gehrmann

BY GUY SUNDT
Director of Athletics, University of Wisconsin

I am happy for this opportunity to talk on distance running, and particularly distance running as it pertains to Don Gehrmann. I have been associated with track for twenty-five years, as an assistant to Mr. Tom Jones, and for the last couple of years as head track coach at the University of Wisconsin.

I feel flattered that I have been asked when there are a lot of coaches who have had a lot more experience than I in long distance running and cross country.

The running of Don Gehrmann has brought a lot of attention to Wisconsin and many people are interested in what he does in the way of a training schedule. I am sure that you will agree Don is a most unusual runner in that he can recuperate very quickly after a hard race and be ready for another one in a very short time.

Don starts out in the fall in cross country. We are very strong for that sport at Wisconsin, because we feel that it gives a strong base in conditioning for the track season later in the year. Don is not a great cross country man, but he is better than average, and has won his share of races at three and four miles. After the season for this sport is over, we let him taper off a bit, then build up again for the indoor season.

His usual workout on a Monday during track season is an over-distance workout of 2¼ miles, running what we call a build-up quarter at the end. Tuesday is his play day when he runs quarters or anything else where he can step in and run with some of his team mates. He may run as many as four quarters if there are four other groups running this distance for part of their workout. Usually the last one he runs will be the fastest. Wednesday he runs a three-quarter for speed. He may hit anywhere from 3:01 to 3:10. Thursday he goes back to over-distance to carry him until competition on Saturday. The distance will be a mile and a half. The mile will be in about 4:35 and the time for the total distance will be 6:45-7:00. This workout is where Don differs from most other men, as he seems to thrive on hard work. Our other milers could not stand this second day of over-distance during the week, and we do not recommend it for the general run of milers. Possibly he feels he needs this work because of the conditioning he must maintain to run two or three races each week. There is no workout on Friday with competition on Saturday.

This type of work may be somewhat different than most of you are used to, and as I said before we don't believe it can be prescribed for just any miler.

Jim Fuchs, 58′ Putter

BY RICHARD I. MILLER
Instructor, University of Illinois

(Article and Pictures Courtesy of Scholastic Coach)

Shot-putting has developed tremendously since H. E. Bauermeyer set the American record at 32 ft. 5 in. in 1876. Today this mark couldn't win a high school dual meet. At Oslo last summer, Jim Fuchs boosted the standard all the way up to 58 ft. 4 27/64 in.

What has accounted for this 26 foot increase? Most of the improvement may be attributed to two factors. First, we have thousands of more boys putting the shot. And, second, the techniques of coaching and training have been revolutionized.

Before delving into the teaching of the event, let us analyze the physical constituents of the putt-working around an exclusive motion picture sequence of the current world's champion, Jim Fuchs.

Initial Stance. When preparing for the effort, the putter carries the shot in his left hand in order to keep his right wrist fresh and relaxed.

He takes a position at the back of the circle, with the right foot next to the back edge at a right angle with the intended direction of the throw, and the left foot a foot or two ahead of the right. The left arm may be extended at shoulder level (pictures **Nos. 1 and 2**) or it may be curved toward the chest in Chuck Fonville fashion.

It is important to carry the shot outside the right foot so that a plumb line dropped from the shot would touch the ground at a point outside the right foot (**No. 2**).

This position assures a maximum distance through which acceleration may take plaee, and places the trunk muscles under stretch. Physiologically, a muscle under stretch can exert greater force than a muscle that isn't under a slight stretch before muscular contraction.

Particularly note Fuchs' knee and side flexion in **No. 2**. The back is kept relatively straight with the buttocks in line with the back bone. As in weight lifting, a straight back is necessary for the greatest utilization of strength.

Fuch's initial position varies from the normal. The plane of his shoulders (**Nos. 1 and 2**) is tilted appreciably from the relatively level hip plane. This allows the left leg to be extended further forward (**No. 4**). Notice how he supports the shot about six inches above the nap of the neck. Fonville and other champions have cupped the shot against the nap of the neck.

Glide. The putter takes two or three preliminary leg swings for rhythm, balance and confidence. According to Francis, the free leg action employed so differently by champion putters does not influence the glide because the action from initial stance to delivery stance is basically the same for every putter.

When the athlete feels ready to throw, the glide across the ring is initiated by a vigorous forward swing of the free leg (**No. 3**). A fraction of a second later, a push is made from the right foot (**No. 4**).

Ken Doherty, the Penn coach, does not agree with this point. He contends that speed across the ring comes more from "falling forward with balance" than from throwing the left leg forward and pushing with the right foot.

1

2

Doherty's protege, Charles Fonville, observes this method. Although Fuchs and Fonville may differ on this technique, both attempt to achieve the greatest controlled speed across the ring.

The glide carries the right foot from its initial position (No. 2) to the middle of the ring (No. 6). The right foot barely clears the ground during the glide. Close observation of Fuchs' glide (No. 5) shows a line dragged by the right foot, proving that his right foot retained light contact with the ground throughout the glide. A hopping action produces a loss of valuable speed and smoothness.

Fuchs' extreme side bend places the body in a low position during the glide (Nos. 5 and 6). Fonville uses a moderately low body glide which is higher than Fuchs' glide, while Thompson carries the body too high during his glide. Too high a body glide does not allow the putter full utilization of leg drive.

Fuchs can manage a low glide because his right leg is unusually strong and can extend quickly enough to properly coordinate his leg drive with the other delivery forces. A putter with an average leg strength and reaction time would not be able to use the style Fuchs' coach has fitted to him.

Delivery. There should be no hesitation between the glide and the delivery. Too often, putters rotate the upper trunk at the finish of the glide in preparation for the delivery. Although rotation places the chest and shoulder muscles under stretch and adds a small distance to the total distance through which the arm can push, these advantages are overbalanced by the loss of acceleration caused by the rotation or "cocking" of the right arm and shoulder.

Frank Ryan, Yale field coach, says that Fuchs tries not to "cock" his arm and shoulder. However, judging from the evidence in No. 6, he has not entirely overcome this fault. Fonville shows very little hesitation between the glide and delivery actions.

Several forces must be coordinated properly for maximum distance. The right foot and right leg begin pushing against the ground before the left foot lands (No. 6). Notice the change of Fuchs' facial expression in Nos. 5 and 6, indicating applied muscular strength.

The position of Fuchs' right foot (Nos. 6 and 7) may be questioned. If the right toe were pointed toward the camera lens, the leg muscles would be at a better pushing angle and the forward rotation of the thigh would be simpler.

The extension of the right leg starts the hip and trunk rotation (Nos. 8 and 9). The powerful trunk muscles add force to the power from the leg drive, and this explosive surge passes to the chest, shoulder, and arm muscles.

The left elbow is thrust backward (Nos. 7 and 8), placing the chest muscles under stretch and helping pull the right shoulder forward.

The right elbow should be approximately behind the shot, although evidence is lacking in regard to whether or not the arm exerts the greatest force when the elbow is directly behind the shot. In Fuchs' sequence (Nos. 8 and 9), the right elbow appears too high. Faulty head movement accounts for part of this high elbow action. The head should be up instead of back and sidewards.

The shot should be delivered forward from the shoulder (Nos. 8 and 9). If the right foot leaves the ground before the shot leaves the fingertips, some of the driving force of the throw will be lost. Fuchs' right foot leaves the ground at the same time the shot leaves the fingers (Nos. 9 and 10). Fonville delays the right foot a fraction of a second longer before reversing.

A timely wrist snap will increase the horizontal distance of the effort. Notice the wrist flick apparent in Fuchs' effort (No. 11).

Champion putters carry the shot well up on the fingers having developed the strength and control for this advantageous position. For the beginner, however, it is advisable to carry the shot in the palm, then as strength, control, and confidence are developed, to move the shot up on the fingers.

Summarizing the approximate sequence of the parts

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8

4 5 6

which make up the whole delivery action:

1. The right thigh is extended and rotated outward.
2. The right thigh action starts the right hip and trunk forward.
3. The left elbow is thrust back and downward forcefully.
4. The hip and trunk action is transmitted to the right shoulder which starts forward.
5. The chest and shoulder contributions are passed to the right arm which forcefully extends at the elbow.
6. A final push is added by a well-timed flick of the wrist and fingers. Klemm believed that the shot put was a movement which began in the toes and ended in the fingers.

Reverse. The reverse, which prevents the thrower from fouling, is employed by a large majority of champions. Both Fuchs and Fonville use a very fast reverse.

In this technique, the right foot comes off the ground a split-second after the finger flick, and continues forward to the toe board (**Nos. 10-12**). The left foot comes off the ground a split-second later than the right foot swings backward and up.

It is advisable to withhold teaching the reverse until it is needed, since early emphasis on reversing may minimize the importance of the leg drive.

TEACHING AND TRAINING

Whole vs. Part Method of Teaching. Whole-method teaching presents the activity as a single unit or whole action, while the part method breaks the activity down into its various parts so that each component may be practiced and developed as a single action, then integrated into a coordinated whole action.

Some activities cannot be broken down for part-method teachng. For example, it is impossible to stop the act of pole vaulting (takeoff to landing) to work on a weakness. The performer must go through the whole action with mental emphasis on the correction.

Another example, a runner attempting to develop a higher kickup of the trailing leg must run in order for the trailing leg to kick up at all. The kickup is a link in the chain of reactions which, together, form the whole action of running. If a link in this chain is taken out and practiced, the chain is broken and the whole action is no longer possible.

Although adequate experimental evidence is lacking, practical observation and coaching seem to favor the part method for teaching the shot. The put is divided into four parts: initial stance, glide, deliver, and reverse.

Throwing from the delivery stance with a four- or six-pound shot is the recommended introduction. The beginner must learn to coordinate the leg drive, hip and trunk, shoulder and arm, and wrist and finger actions into one smooth delivery action.

The proper timing for these parts is important and deserves special emphasis. If the novice must concern himself with initial position, movement across the circle, plus the mentioned actions from the delivery stance, then the delivery actions will not receive due emphasis.

When the beginner has coordinated the actions from the delivery stance reasonably well, it is time to work on initial position and glide across the ring. The final step calls for an integration of the initial stance, glide, delivery, and the reverse (if needed) into the whole action of putting (whole method). To develop timing thereafter, the practice putting should be as a whole action (initial stance to reverse).

Light to Heavy Shot. To develop smooth and continual acceleration, the novice is first introduced to the whole action with a four or six pound shot. The novice practices the total action with the lightweight shot until he develops a smooth and continuous action. As soon as his progress permits, he should move on to the nine and then the regulation twelve-pound weights.

Practice Emphasis on Maximum Performance vs. Form. At the high school level, boys are passing from clumsy adolescence into early maturity. Although they pick up activities eagerly, their physical movements are often somewhat clumsy. Since motor learning seems to

10 11 12

take extra effort for the adolescent, most of the practice should be spent on perfecting the required technique.

Emphasis on maximum performance causes the boy, especially the beginner, to forget form. This both retards the learning process and increases the chance of injury. An occasional maximum effort in practice may be needed to decide team places or as a motivating device. But, in general, the high school practice sessions should be devoted to perfection of form with occasional near maximum or maximum performance.

Length of Skill Practice Periods. Based on the findings of Griffith, 20 or 30 minutes of activity on a particular skill represents the optimum. Longer periods induce fatigue and inattentiveness. The key words in this instance are "on a particular skill." For example, 20 minutes on starting and 30 minutes on the shot put represent practice on two different skills, thus the time distribution would be satisfactory.

Motivation. The learner must be eager to learn. He cannot be forced into learning but must be ready for it. Elbert Hubbard once said, "You can lead a boy to college but you can't make him think." In addition to motor educability and technique of skill instruction, the rate of learning is proportional to the degree of concentration and interest the learner displays toward the activity.

The success of a coach in motivating his squad to "dig in and work" will, in no small part, depend upon his enthusiasm. Where the coach is very enthusiastic, the squad will catch some of his "fire."

Some ways to motivate your putters include: (1) Be enthusiastic about the event. (2) Have a sound and well-rounded knowledge of the event. (3) Use stories of average putters who developed into champions. "Nobody starts out as a champion." (4) Know the styles of the outstanding collegiate putters and use their pictures on the track and field bulletin board. (5) Keep a progress chart of the boy's performance in every meet. (6) Take a sincere interest in the boy as a human being as well as a shot-putter.

Positive Approach. With few exceptions, the words "don't" and "no" should be excluded from teaching technique. People tend to be put on the defensive by the negative approach and often develop mental barriers against whatever conversation follows.

The positive approach has the same goal in mind, but different pathways are used to reach it. Instead of saying "Don't raise the throwing elbow that high," say, "Try keeping the throwing elbow a little lower; it will allow you to exert greater force." Instead of saying, "No! That's not right," say, "How about trying it this way next time?"

It is difficult to remember the positive approach when patience runs low or when disgust burns high, but it is just at these times that a positive approach is most needed.

THE NEGATIVE APPROACH

A few individuals respond better to the negative approach, and the coaching psychology must be adapted to them. The negative approach may also be used effectively when stern disciplinary measures are necessary.

Training. Track coaches generally agree that the off-season offers the best time for the putter to develop strength. During the competitive season, the efforts should be bent toward speed and timing and having a maximum explosive snap when needed. Weight lifting and a great deal of putting with a heavier shot represent two good off-season methods of developing strength.

The four to six weeks pre-season training period should be devoted to building strength and speed, and perfecting technique and timing. During the competitive season, strength exercises should be done with the greatest possible speed at about half the maximum capacity. This preserves the snap and places emphasis no fast reaction.

Work Schedule. Every workout or meet competition should begin with a very thorough warm-up. One pulled muscle from an inadequate warm-up may sideline an athlete for the season. Shot putters should begin every workout with a short jog of 100 to 200 yards followed by some exercises, then take three to six wind sprints and more exercises.

For the first week of pre-season training, the coach may find it beneficial to lead the squad through a series of calisthenics designed to warm up all the body muscles. This is the simplest and most effective way of teaching the squad warming-up exercises. After the first week, allow each boy to do his own warm-ups since the group movements do not make adjustments for individual differences and needs.

The weekly schedule given below is a typical mid-season program for the average high school putter. Adjustments must be made for each individual and consideration should be given to weather conditions.

Monday. Thorough warm-up and 20 minutes of arm work. Give your boys a couple of dozen easy throws stressing technique and correction of faults. Finish the workout with a half-dozen sprint starts and a 100-yard dash for time.

Tuesday. The daily warm-up followed by a half-dozen extra wind sprints. Tuesday is the best day for a couple of near maximum throws if that seems advisable. The throws should be started easily and increased in effort as the putter feels ready. Not over a half-dozen near maximum or maximum efforts should be taken. Finish the workout with 20 minutes of armwork and a 100 or 220-yard dash.

Wednesday. The putter, as all track and field athletes, should warm up very thoroughly before each workout. Have your prospects throw a dozen or more times stressing form. Work on the faults noticed during Tuesday's workout. Allow the putters to work on whatever other events they want. Finish the workout with a 100-yard dash for time.

Thursday. This is a day of rest for the big Friday effort. A few calisthenics at home are optional depending upon the individual.

Friday. Have your putters at the ring in plenty of time for a slow and careful warm-up. Before competition, a half-dozen practice throws are generally enough. The last couple of throws should be full effort. Make sure your boys keep warm between efforts.

Teach your athletes to give their utmost, but to keep relaxed and collected.

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The Discus Turn and Throw

BY FRANK RYAN
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(Article and Pictures Courtesy Scholastic Coach)

Even a clear and detailed mental imagery of the action of the discus throw does not insure good coaching. Effective coaching depends upon the ability to (a) distinguish fundamentals from irrelevancies, (b) separate symptoms from causes, and (c) assign priority to those aspects of the throw most amenable to direct coaching attack.

In teaching the discus turn, it is important to keep the few criteria of a satisfactory turn clearly in mind. There is a tendency to forget that two equally effective turns may vary in certain details.

Some coaches fail to make the most efficient use of their time because of a rigid concern with irrelevant idiosyncracies of the thrower or because of an assiduous application to symptoms instead of causes.

The sole and simple purpose of the discus turn is to gain momentum. However, the price of this momentum must not be poor throwing position or fouling. In evaluating the turn, three questions must be asked:

1. Is the athlete in a favorable throwing position upon completion of the turn?
2. Does sufficient room remain to throw freely and without fouling?
3. Has momentum been attained?

A few remarks about each of these essentials is pertinent.

There is little disagreement among coaches as to what constitutes a favorable throwing position. In brief, good throwing position is characterized by the following features.

1. The athlete is well-balanced.
2. The right leg is bent and supports the body weight.
3. The left leg is placed approximately in line with the intended direction of throw.
4. The right arm is drawn well back and the body is turned in a clockwise direction.

Other variables held constant, the distance of the throw will be a direct offshoot of the amount of momentum attained. Obviously, the discus thrower should try for all the speed he can "get away with." However, there exists what might be termed the "critical speed" of turn. Beyond this speed the thrower is unable to attain favorable throwing position.

The evidence seems to be that when the individual exceeds this speed, deterioration of form is extremely rapid. Universal application of this concept is difficult since "critical speed" varies not only from athlete to athlete but for the individual athlete with conditioning, stage of progress, etc.

Furthermore, whereas the effects of exceeding this speed may be only slightly deleterious for some men, others may make a shambles of their form through excess speed. Since nearly all discus throwers tend to work above critical speed, exhortations for greater speed can hardly be considered good coaching procedure.

The long foul throw brings satisfaction to few coaches. It may seem naive to point out that the circle's limits must be a consideration in developing an athlete's turn; yet, some throwers are astonishingly stubborn about making adjustments—even in the face of constant fouling.

A few examples will be presented of instances where coaching energy is often misdirected. It is by no means implied that attention should never be given to these areas; however, it is maintained that these areas do receive a disproportionate share of coaching time.

Handhold: A good deal of unnecessary coaching effort is expended in instructing the athlete in the handhold and almost as much time has been wasted in theoretical discussions concerning the advantages of one type over another.

Every successful discus thrower has been well-oriented with respect to the discus. By much throwing and handling, he has developed a "feel" for the discus. He has learned to respond to subtle proprioceptive cues which permit him to make the most use of centrifugal force. Also, his familiarity with the discus permits control at the end of the backswing when no centrifugal force exists.

The top-notch thrower can introduce a number of variations into the hold and still have the discus end up in the right place at the end of the turn. In short, an effective handhold is more a result of orientation than a result of direct coaching.

Preliminary Swings: Three preliminary swings are usually sufficient. Though a greater number of swings add nothing to the throw, they should not be made the target of a direct coaching attack. These extra swings are symptomatic, not causal. They indicate lack of confidence and will eventually drop out.

Pivot Foot Position: Traditionally, discus footwork was taught to take place along a straight line drawn through the center of the circle. However some 15 years ago a few men began to get good results by placing the pivot foot close to the rear of the circle.

Ostensibly, this change offered two advantages: (a) greater room for the hop and (b) an extra quarter-turn. More and more top-notch throwers adopted the new style and enthusiasm for it spread. In their enthusiasm, many coaches forgot that the traditional straight-line style still permitted a good turn.

There is no quarrel with this new method of placing the left foot. However, it is poor coaching procedure to make this variation an end in itself and to insist that all throwers use it. There is considerable evidence that the use of this new foot placement will decrease throwing effectiveness in the case of some individuals.

Relaxation: No athletic event can be executed without proper relaxation—least of all the discus. Yet, relaxation comes only with increased mastery of the event; the athlete does not simply decide to relax or will himself to do so.

Undeniably, there are some athletes who would profit by the direct suggestion to relax. However, it should be realized that tension is a natural concomitant of learning a strange event and is not to be eliminated at the coach's direction. Constant nagging or urging the discus thrower to relax may produce an effect quite the opposite from the intended one.

Vic Frank

177 ft. 11¼ in.

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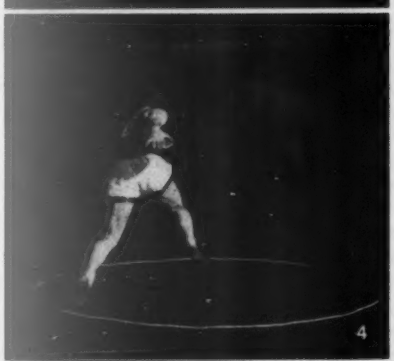
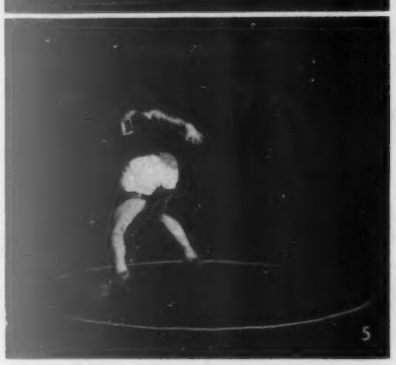


No. 6: Frank is just reaching throwing position and is in favorable position to drive with big muscles of body. Left foot has not yet touched ground, but throw has actually started. Weight is supported over bent right leg—novice usually lands with weight forward over left leg and right leg already sprung. Frank is facing at right angles to direction of throw—tyro is usually facing direction of throw. Right arm is still well-cocked — novice's arm is often forward and not in position to deliver full blow.

No. 7. Although right leg and hips have already contributed much power, throwing arm remains well back. Tyro tends to initiate drive with arm.



No. 8: Additional proof that hips have led throw.

No. 9: Right leg and hips have almost completed their work and chief effort is now being supplied by upper body and arm. Frank is building up terrific acceleration, whereas novice, at this point, is usually falling away from throw. Note bracing and lifting action of left leg. Novice's left leg is usually far "in bucket," in no position to make contribution to throw.

No. 10: Frank finishes throw by reversing feet. Left foot remained on ground until discus left hand. Novice often attempts to reverse during, instead of after, the throw.

Approaching

1 Start of crossover.

2 Crossover—hips face forward, right shoulder back and down.

3 Right foot landing after crossover. Note arm is not fully

4

5

6

Approaching mark—overhead carry.

Start of javelin being brought back.

Long easy strides. Start of weight shift back. Note hips face forward, right shoulder starts back, javelin completes back swing.

Note relaxed position.

Start of crossover.

Crossover—hips face forward, right shoulder back and down.

Right foot landing after crossover. Note arm is not fully

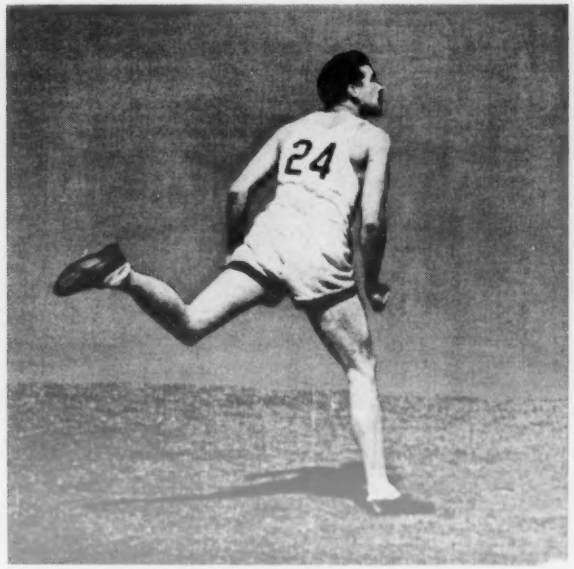
Excellent landing position. Note length of stance—left foot not yet landed, yet arm has started the throw. This position was gained by proper crossover.

Start of throw.

Hips snap forward pulling right shoulder forward. Note relaxed right arm. Elbow leads. Preferable to have right foot remain on the ground trifle longer.

Completion of throw at height of arm. Note rise up and over the left leg action.

Follow through.



Note length of follow through step straight ahead.

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Note relaxed position.

Start of crossover.

Crossover—hips face forward, right shoulder back and down. Throwing position is gained by this action.

Right foot landing after crossover. Note arm is not fully extended. Preferable to have javelin pointed in line of throw.

1 2 3

Doherty's protege, Charles Fonville, observes this method. Although Fuchs and Fonville may differ on this technique, both attempt to achieve the greatest controlled speed across the ring.

The glide carries the right foot from its initial position (**No. 2**) to the middle of the ring (**No. 6**). The right foot barely clears the ground during the glide. Close observation of Fuchs' glide (**No. 5**) shows a line dragged by the right foot, proving that his right foot retained light contact with the ground throughout the glide. A hopping action produces a loss of valuable speed and smoothness.

Fuchs' extreme side bend places the body in a low position during the glide (**Nos. 5 and 6**). Fonville uses a moderately low body glide which is higher than Fuchs' glide, while Thompson carries the body too high during his glide. Too high a body glide does not allow the putter full utilization of leg drive.

Fuchs can manage a low glide because his right leg is unusually strong and can extend quickly enough to properly coordinate his leg drive with the other delivery forces. A putter with an average leg strength and reaction time would not be able to use the style Fuchs' coach has fitted to him.

Delivery. There should be no hesitation between the glide and the delivery. Too often, putters rotate the upper trunk at the finish of the glide in preparation for the delivery. Although rotation places the chest and shoulder muscles under stretch and adds a small distance to the total distance through which the arm can push, these advantages are overbalanced by the loss of acceleration caused by the rotation or "cocking" of the right arm and shoulder.

Frank Ryan, Yale field coach, says that Fuchs tries not to "cock" his arm and shoulder. However, judging from the evidence in **No. 6**, he has not entirely overcome this fault. Fonville shows very little hesitation between the glide and delivery actions.

Several forces must be coordinated properly for maximum distance. The right foot and right leg begin pushing against the ground before the left foot lands (**No. 6**). Notice the change of Fuchs' facial expression in **Nos. 5** and **6**, indicating applied muscular strength.

The position of Fuchs' right foot (**Nos. 6** and **7**) may be questioned. If the right toe were pointed toward the camera lens, the leg muscles would be at a better pushing angle and the forward rotation of the thigh would be simpler.

The extension of the right leg starts the hip and trunk rotation (**Nos. 8** and **9**). The powerful trunk muscles add force to the power from the leg drive, and this explosive surge passes to the chest, shoulder, and arm muscles.

The left elbow is thrust backward (**Nos. 7** and **8**), placing the chest muscles under stretch and helping pull the right shoulder forward.

The right elbow should be approximately behind the shot, although evidence is lacking in regard to whether or not the arm exerts the greatest force when the elbow is directly behind the shot. In Fuchs' sequence (**Nos. 8** and **9**), the right elbow appears too high. Faulty head movement accounts for part of this high elbow action. The head should be up instead of back and sidewards.

The shot should be delivered forward from the shoulder (**Nos. 8** and **9**). If the right foot leaves the ground before the shot leaves the fingertips, some of the driving force of the throw will be lost. Fuchs' right foot leaves the ground at the same time the shot leaves the fingers (**Nos. 9** and **10**). Fonville delays the right foot a fraction of a second longer before reversing.

A timely wrist snap will increase the horizontal distance of the effort. Notice the wrist flick apparent in Fuchs' effort (**No. 11**).

Champion putters carry the shot well up on the fingers having developed the strength and control for this advantageous position. For the beginner, however, it is advisable to carry the shot in the palm, then as strength, control, and confidence are developed, to move the shot up on the fingers.

Summarizing the approximate sequence of the parts

7 8 9

Throwing position is gained by this action.

4 5 6

which make up the whole delivery action:

1. The right thigh is extended and rotated outward.
2. The right thigh action starts the right hip and trunk forward.
3. The left elbow is thrust back and downward forcefully.
4. The hip and trunk action is transmitted to the right shoulder which starts forward.
5. The chest and shoulder contributions are passed to the right arm which forcefully extends at the elbow.
6. A final push is added by a well-timed flick of the wrist and fingers. Klemm believed that the shot put was a movement which began in the toes and ended in the fingers.

Reverse. The reverse, which prevents the thrower from fouling, is employed by a large majority of champions. Both Fuchs and Fonville use a very fast reverse.

In this technique, the right foot comes off the ground a split-second after the finger flick, and continues forward to the toe board (**Nos. 10-12**). The left foot comes off the ground a split-second later than the right foot swings backward and up.

It is advisable to withhold teaching the reverse until it is needed, since early emphasis on reversing may minimize the importance of the leg drive.

TEACHING AND TRAINING

Whole vs. Part Method of Teaching. Whole-method teaching presents the activity as a single unit or whole action, while the part method breaks the activity down into its various parts so that each component may be practiced and developed as a single action, then integrated into a coordinated whole action.

Some activities cannot be broken down for part-method teachng. For example, it is impossible to stop the act of pole vaulting (takeoff to landing) to work on a weakness. The performer must go through the whole action with mental emphasis on the correction.

Another example, a runner attempting to develop a higher kickup of the trailing leg must run in order for the trailing leg to kick up at all. The kickup is a link in the chain of reactions which, together, form the whole action of running. If a link in this chain is taken out and practiced, the chain is broken and the whole action is no longer possible.

Although adequate experimental evidence is lacking, practical observation and coaching seem to favor the part method for teaching the shot. The put is divided into four parts: initial stance, glide, deliver, and reverse.

Throwing from the delivery stance with a four- or six-pound shot is the recommended introduction. The beginner must learn to coordinate the leg drive, hip and trunk, shoulder and arm, and wrist and finger actions into one smooth delivery action.

The proper timing for these parts is important and deserves special emphasis. If the novice must concern himself with initial position, movement across the circle, plus the mentioned actions from the delivery stance, then the delivery actions will not receive due emphasis.

When the beginner has coordinated the actions from the delivery stance reasonably well, it is time to work on initial position and glide across the ring. The final step calls for an integration of the initial stance, glide, delivery, and the reverse (if needed) into the whole action of putting (whole method). To develop timing thereafter, the practice putting should be as a whole action (initial stance to reverse).

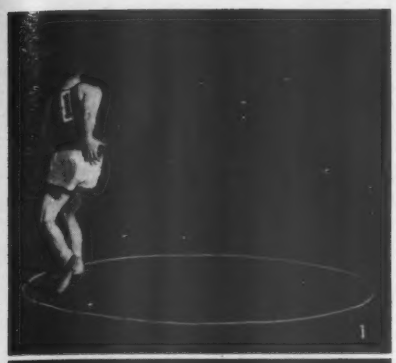
Light to Heavy Shot. To develop smooth and continual acceleration, the novice is first introduced to the whole action with a four or six pound shot. The novice practices the total action with the lightweight shot until he develops a smooth and continuous action. As soon as his progress permits, he should move on to the nine and then the regulation twelve-pound weights.

Practice Emphasis on Maximum Performance vs. Form. At the high school level, boys are passing from clumsy adolescence into early maturity. Although they pick up activities eagerly, their physical movements are often somewhat clumsy. Since motor learning seems to

10 11 12

Vic Frank

177 ft. 11¼ in.



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